

AUSTRALIAN INTERNATIONAL DEVELOPMENT ASSISTANCE BUREAU

FORESTRY DIVISION

MINISTRY OF NATURAL RESOURCES

SOLOMON ISLANDS NATIONAL FOREST RESOURCES INVENTORY

**FOREST ECOLOGY AND BIOGEOGRAPHY IN THE
SOLOMONS**

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Honiara, DECEMBER 1994

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Project Working Paper 15

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EXECUTIVE SUMMARY

Four main objectives regarding the Solomon Island flora and vegetation have been addressed by this paper, they are:

- a literature review of the important features of the vegetation and flora;
- an analysis of tree floristics and the relationship between forest structure and environmental variables. This was based on data gathered by the SOLFRIP field teams;
- demonstrated use of the SOLFRIP database system; and
- recommendations for further botanical work.

Factors Influencing Plant Distribution and Forest Composition

The most important climatic, edaphic, historic and anthropogenic influences on the vegetation of the Solomon islands were identified as:

- a high and relatively constant temperature and rainfall providing conditions for the widespread distribution of tropical rainforest;
- a high and rapid increase in elevation from sea level to mountaintops which may exceed 2000 m on the larger islands. This provides for an increase in rainfall and exposure to strong winds with altitude, and a decrease in temperature; all of which are seen to influence the composition and structure of the upland rainforests;
- the presence of a seasonal cyclone period resulting in a high disturbance of the forests and possible adaptation of the forest ecology to high winds which include cyclones;
- the influence of rainshadow areas on Guadalcanal, the Florida Islands and possibly northern Makira which have contributed with assistance from anthropogenic firings, to the expansion of grasslands in those area;
- a high rainfall resulting in a high leaching of soil nutrients across most soil types with the result that forest differences due to soil/geology variability are substantially reduced. The most significant variants are the forests found on ultrabasic rock which vary in structure and floristics due to the loss of the most readily leached soil constituents and extreme accumulation of oxides of aluminium, iron, titanium as well as nickel and chromium in some areas;
- the similarity of the Flora of the islands to that of Asia and New Guinea indicating that the flora is mostly of an immigrant nature and relatively young i.e less than 20 million years old in view of recent geological research in the group;

a significant reduction in species diversity per unit area as compared to the source area (i.e. Asia/New Guinea) indicating that the flora is disharmonic. A possibility exists that the disharmonic and relatively young nature of the flora although not producing as yet, a high number of new species, may be showing signs of variability at the below species level. This hypothesis needs to be tested through the duplicate collection and comparison of the flora throughout the group.

Classification of the Vegetation and Flora

The classification of the vegetation communities was found to be in need of revision due to the poorly collected nature of the flora particularly plants other than trees and shrubs, and the changing management requirements related to forestry and conservation issues. The most comprehensive classification was found to be that compiled by Hansell and Wall (1976) but the classification was seen to be clumsy as an easily used ecological classification system. This was due to the composite use of Air Photo Interpretation (API) based classifications and a limited ground truthing of species.

The flora of the Solomon Islands was also found to be in need of revision even though Henderson and Hancock (1988) attempted to update the initial species lists compiled by Whitmore (1969). The resultant lists only reflected botanical specimens held in the Honiara Herbarium, were confused over the term endemic and did not take into consideration recent name changes or synonyms.

Important Botanical Features

Botanical features which make the Solomon island flora ecologically noteworthy and important as a conservation issue were identified as:

- a relatively young age of the flora providing an opportunity for the study of biotic migration and speciation at a relatively early developmental stage;

- disharmonic nature of species composition, the varied size and distance and abrupt changes in the elevation of the island groups which may be in part assisting the evolution of the biota;

- the high number of varied environments, large island size and semi-continental nature of the ecology as compared to other South Pacific countries;

- the overlap of three migration pathways i.e. from the Asia region, the West Pacific region and the islands to the south of the Solomons. This has resulted in the coincidence of termination points in the Solomons of a number of species and the formation of species assemblages which differ from elsewhere in the region regarding their diversity and composition.

SOLFRIP Data

The analysis of the SOLFRIP (Solomon Island Forest Resources Inventory Project) field data revealed a number of tree floristic associations and indicated the importance of disturbance due to strong winds or cyclones as the major factor in influencing forest structure and composition. The influence of slope, aspect and soils showed little effect on the lowland forests. Disturbance due to animal digging was found to be high on most islands except Malaita and Rennell where wild pig populations have been nearly hunted to extinction. Flooding was the only other factor found to be of importance in controlling structure and composition particularly near watercourses and flat permanently or seasonally wet areas.

The forests were also found to possess a high number of tree seedlings in the understorey, possibly as an adaptive response to constant cyclone disturbance i.e. gap size could be important in controlling seedling types, vigour and numbers. This knowledge could be useful if management practices are introduced that consider the future of the forest as a continued timber resource as well as its other multi-use functions. This tree seedling layer if managed correctly through minimal ground disturbance by forest machinery and the control of the understorey layer exposure to extreme temperatures (seeds and seedlings are cooked by exposure to harsh sunlight) would provide for the continued existence of a forest industry in the Solomon Islands and the multi-use function of the forest.

Recommendations

Recommendations arising from the study include:

- a study of forest gap size and seedling dynamics with application to sustainable forestry management practices is indicated;

- improvement of the present forest classification systems described by various authors, a need for an understanding of the conservation status of plants, construction of a simple key for trees and shrubs, and increased collection of the interior forests especially plants other than trees and shrubs;

- introduction of a multi-use forest reserve system based on customary land ownership;

- improved forest training in the fields of ecology and resource management;

- facilitate the forest research in the country by establishing a priority list for research and invite Universities to assist with the studies.

A NOTE ON THE METHODOLOGY USED

Base Line and Strip Line Location

The islands of the Solomon archipelago were divided into eight broad regions based on the general geographical relationships of the group. These were referred to as regional units which were in turn divided into Sub-regional units (SRU's) based upon natural watershed divisions. The regional units included:

- * Guadalcanal, Florida and Russell Islands (Region One);
- * Malaita (Region Two);
- * Choiseul (Region Three);
- * Isabel (Region Four);
- * New Georgia Group (Region Five);
- * Makira (Region Six);
- * Santa Cruz (Region Seven); and
- * Rennell (Region Eight).

Sub-regional units were randomly selected for each regional unit and a sampling base line (starting point) established from which strip lines were extended inland. Base line selection was determined by Air Photo Interpretation (API) and where possible by local knowledge and/or aeroplane flights over the area. They were normally located along ridge lines but were in some cases located along rivers, roads or straight lines in flat country. The strip lines were located randomly along the base lines and directed at right angles to the main topographic features where possible.

Plot Size, Location and Data Type

Tree floristics data

Three plot sizes were selected for the tree floristics i.e. 20m, 10m and 5m plots as a nested group. In these plots, species name was recorded for trees exceeding a diameter of 60cm, 30 to 60cm, and 10 to 30cm respectively. Location of the initial plot group along each strip line was chosen randomly between 50 and 150m from the base line, and 100m apart thereafter. Information for assessment of tree volume was also gathered and is explained in detail in SOLFRIP (1992) as volumetric assessment is not addressed by this report.

Forest structure and environment data

Structural and environmental data were gathered from 20m diameter circular plots only. These were placed randomly along the strip lines to coincide with the floristics/volumetric plots as well as between these plots enabling an effective assessment of forest variability. Additional structure and environment plots were randomly placed within subjectively selected landsystems not sampled by the strip lines.

Data Gathering and Assessment

The method used for data gathering and analysis of the structural and environmental data was as outlined by Webb, Tracey and Williams (1976). It was designed to enable the accurate collection of physiognomic-structural features of tropical forest vegetation by non-botanists. This was achieved through using presence/absence of environmental features and a four point scale to assess life-form differences i.e. forest structure. This provided data for a general summary of forest structural and environmental variability as well as data for a multi-variate cluster analysis. This analysis enabled the grouping of plots into a range of forest types of similar structure based upon life-form.

The proformae described by the above authors was simplified and some additions made for the unique Solomon Island forest conditions and training needs of the field recorders. Infield parameters were assessed using yes/no answers, circled answers or a 4 point abundance scale i.e. C = Common, O = Occasional, R = Rare, N = Not present. This form is illustrated in Figure 8.

Training of the survey teams was undertaken by the author early in the project before mobilisation to ensure that a reasonable level of proficiency was achieved in the use of the proformae.

The analytical method involved data preparation in the FOXPRO database and transfer to the CSIRO Division of Wildlife and Ecology PatN cluster analysis programme (Belbin, 1989) where the analysis procedure outlined by Webb, Tracey and Williams (1976) was performed with one minor change. This involved a range standisation of the variables instead of Burr's standardisation as this is now considered more accurate. The association matrix was analysed as outlined in the above paper using the Bray and Curtiss (Czekanowski) formulae and a fusion or Agglomerative Polythetic strategy performed using Wards' incremental sum of squares.

In the analysis of the tree floristics, an eight group cluster was selected as this would show floristic and structural relationships between the eight regional units (or main island groups). The cluster analysis was also segregated into the three floristic classes i.e.

- * trees greater than 60cm diameter (Figure 5) where a subset of fifty plots per regional unit were selected and run through the cluster analysis three times, producing a similar output each time. This data subset was selected due to the enormous number of plots i.e. 3,654 taking a calculated 2 weeks of computing time;

- * trees between 30 and 60cm diameter (Figure 6)

- * trees between 10 and 30cm diameter (Figure 7). The three age/size classes were not combined due to the different plot sizes used for each of these classes. To obtain the species association the grouped plot numbers were then compared to their corresponding species codes within the database and species assemblages established.

In the analysis of structure, only seven groups were selected to show relationships among the regional groups as structural data from Rennell had not been entered into the database at the time of analysis. The structural sites clustered in the resultant dendrogram were compared to the environmental variables in an attempt to assess environmental relationships and structure. These environmental variables included altitude; aspect; slope; the soil categories of pH, colour & texture; the disturbance categories of plantation, landslip, old gardens, fallen trees, new gardens, cyclone, walking tracks, fire & animals; the canopy features of height, layers & gaps; and the water categories of distance to nearest water, presence of surface water and type of water.

Cluster diagrams are available from IFERM Pty Ltd, PO Box 2546, Canberra City, ACT, 2600, Australia.

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1. INTRODUCTION

The Solomon Islands are blessed with an abundance provided by its rainforest cover. However, little work has been done on forest classification, composition, customary use, forest ecology and forest management since the 1960s.

The Solomon Islands National Forest Resources Inventory Project (SOLFRIP, 1991-93) presents the opportunity to initiate further studies to provide better information for forest management.

However the description and analysis of vegetation in ecological surveys is limited by three major factors:

- time constraints of the survey related to the scale of the project,
- the level of botanical knowledge of the survey teams and
- the uses to which the output will be used.

A detailed botanical survey of the Solomon Islands within a two year period is undoubtedly, an impossible task. A more attainable goal would be to obtain a coherent understanding of the environmental, edaphic and anthropogenic factors shaping the distribution of plants. One approach to such a study is a structural analysis of the major vegetation types associated with an appraisal of the major factors limiting structural and floristic growth.

An understanding of these key factors and their relationships, in addition to links with data gathered on the major tree floristics and age classes, wild plant use and animal distribution, can assist in developing management strategies by providing much needed basic data on the resources.

This report deals with tree floristics, forest structure and factors influencing plant growth and distribution in the Solomon Islands.

2. OBJECTIVES

The objectives of the study were as follows.

1. Review the literature and provide a summary of forest classifications, forest composition and the botanically significant features of the Solomon Islands flora;
2. Undertake a multivariate cluster analysis of the tree floristics and structural variables collected by the SOLFRIP field teams, to specifically:

distinguish the major floristic and structural types;

identify the major factors influencing tree floristics and forest structure throughout the island group.

3. Demonstrate the use of the SOLFRIP database.
4. Recommend further work.

3. THE PHYSICAL ENVIRONMENT - CLIMATE, GEOLOGY AND SOILS

3.1 CLIMATE

The Solomons lie within the humid maritime tropical zone and have characteristically high ambient temperatures and a high annual rainfall. The surrounding ocean also assists in moderating the climate. Trade winds are responsible for dividing the climate into a dry and a wet season depending on the wind direction but rainfall does not always follow this regular pattern. In some years, little seasonal variation is experienced. In the central interior of the islands, rainfall is regular throughout the year (Lewis & Cribb, 1991). The dry season may be extended due to the two transitional seasons of the year when the weather is unsettled (Aldrick, 1993). This results when the intertropical doldrums pass over the islands.

During the period April to November, the trade wind blows from the southeast and this tends to be the dry season with steady winds, fine days and occasional rain. In the period November to April the wind is from the northwest and this is usually the wetter season (Lewis & Cribb, 1991). Aldrick (1993) comments that most islands have a rainfall "double maxima" in July-August and December-March, with minima in May and October-November. On some islands the presence of high mountains may cause a single maximum and minimum to occur. Rainfall direction may vary from island to island with some areas receiving most of their rain from the south-easterlies and some from the north-westerlies, while others from both. Daily land and sea breezes also play a role in influencing wind direction and hence rainfall (Aldrick, 1993).

Cyclones also build up in the surrounding seas and tend to move south mainly during the wet season (Lewis & Cribb, 1991). Figure One illustrates the major cyclone pathways through the Solomons and frequency of cyclone movement through any given area. Analysis of the number of cyclone paths per grid square (latitude and longitude) for the past thirty years was used as the basis of the map. The map shows that most of the Solomons land areas have experienced a minimum of three to four cyclonic events during the past thirty years (i.e. one every decade) to a maximum of five to six cyclone events every thirty years (i.e. two every decade).

The mean annual temperature is 27.5⁰ C with an average daily maximum of 31.7⁰ C (Walter & Lieth, cited in Lewis & Cribb, 1991).

Rainfall averages 3,133 mm per year (Lewis & Cribb, 1991) but may vary between 2,000 mm per year in the rainshadow area on the northwest coast of Guadalcanal noted by Pendleton (1949) to over 9,000 mm per year on the mountainous "weathercoast" of southern Guadalcanal (Hansell & Wall, 1976). Rainshadows occur on Guadalcanal and to a lesser extent on northern Makira with the Guadalcanal rainshadow extending to the Florida Islands and possibly to the southern coasts of Isabel and San Jorge Islands (Aldrick, 1993). Guadalcanal possesses two extremes in rainfall pattern on either side of its high 2,440 m mountain range. On the northern side, the rainshadow area receives the lowest rainfall in the islands while on the southern or "weather" coast it is the highest with catastrophic daily falls of 600 mm being recorded (Aldrick, 1993). Figure Two illustrates the rainfall patterns in the Solomon Islands and in particular the rainshadow effects and high rainfall areas.

Humidity is highest in the morning and often reaches 90% while in the cooler months it may drop to 60%.

after: Cyclone Tracks, (1990), Solomon Island Meteorological Service.

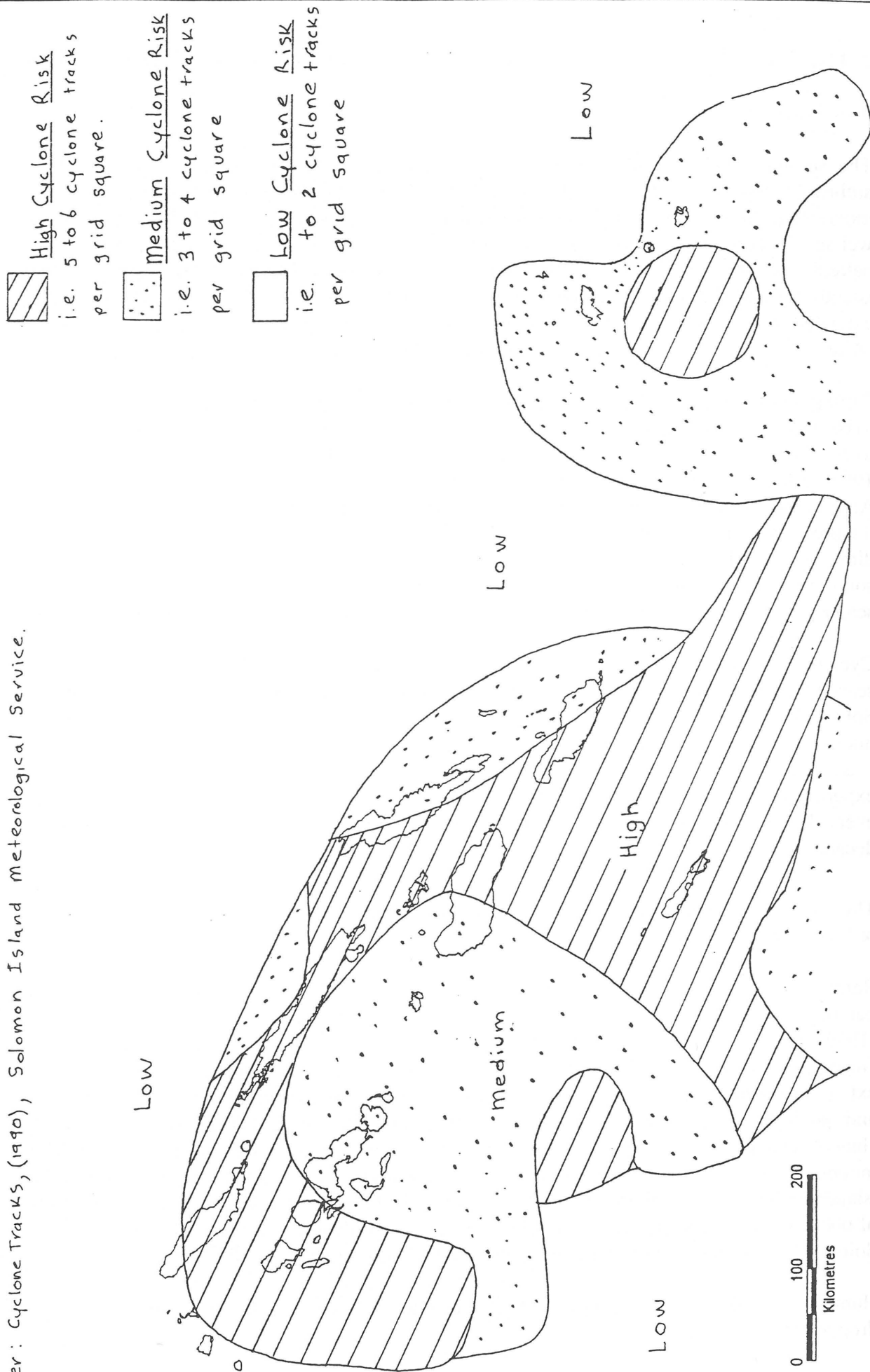


Figure 1. Cyclone risk areas of the Solomon Islands.

after: Climate & Topography Environment, (1987), Solomon Island Meteorological Service.

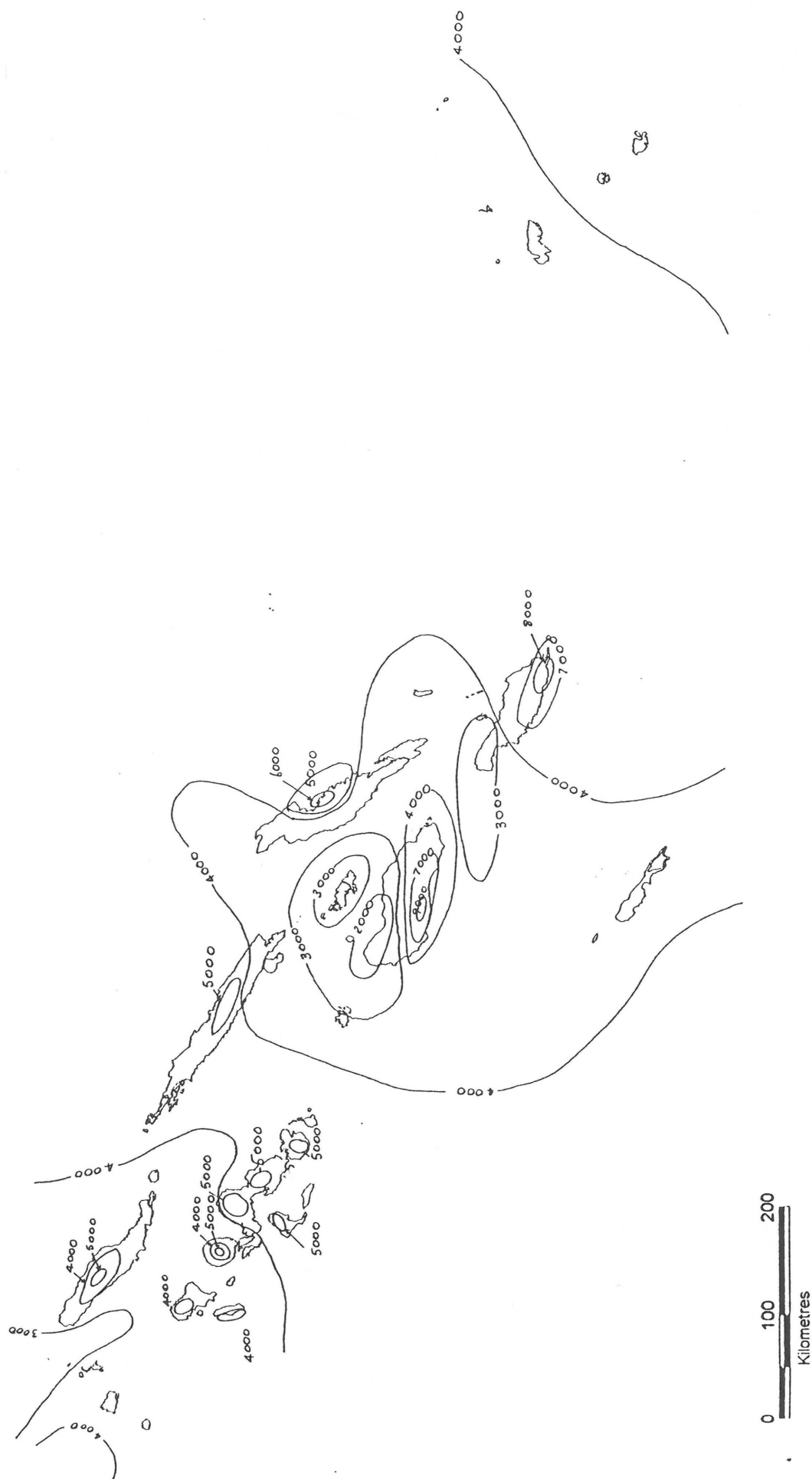


Figure 2. Rainfall patterns in the Solomon Islands.

3.2 GEOLOGY

Figure Three locates the four generalised rock types in the Solomon Islands which reflect their formation process, as well as their possible influence on plant growth and hence plant distribution. These are Volcanic (andesite, basalt); Intrusive (gabbro, diorites, ultramafics); Metamorphic (greenstones, schists, lightly metamorphosed basic lavas) and Sediments (alluvium, organic deposits, uplifted reef, limestones, mudstones, dolomites, sandstones, conglomerates).

A comparison by islands, of the composition of these four generalised rock types (Table One) helps to gain an understanding of physical differences in the substrate from island to island.

TABLE ONE
GENERALISED ROCK TYPES FOUND IN
THE SOLOMON ISLANDS

% by Island				
Island	Volcanic	Metamorphic	Intrusive	Sediments
Choiseul	50	20	10	20
Isabel	50	15	10	25
Malaita	30	0	0	70
Guadalcanal	20	15	15	50
Makira	70	0	10	20
Santa Cruz	70	0	0	30
Rennell	0	0	0	100

Coleman et al (1965) Coleman (1965; 1970) Hackman (1973) Vedder and Colson (1986) and Falvey et al (1991) have provided broad overviews of the geology of the Solomon Islands.

Falvey et al (1991) discusses recent findings in plate tectonics which may also be useful in interpreting plant distribution patterns and plant migration history. They indicate that in the late Cretaceous Era (about 65 million years ago) the Pacific crustal plate collided with the

after: Hansell & Wall, 1976.

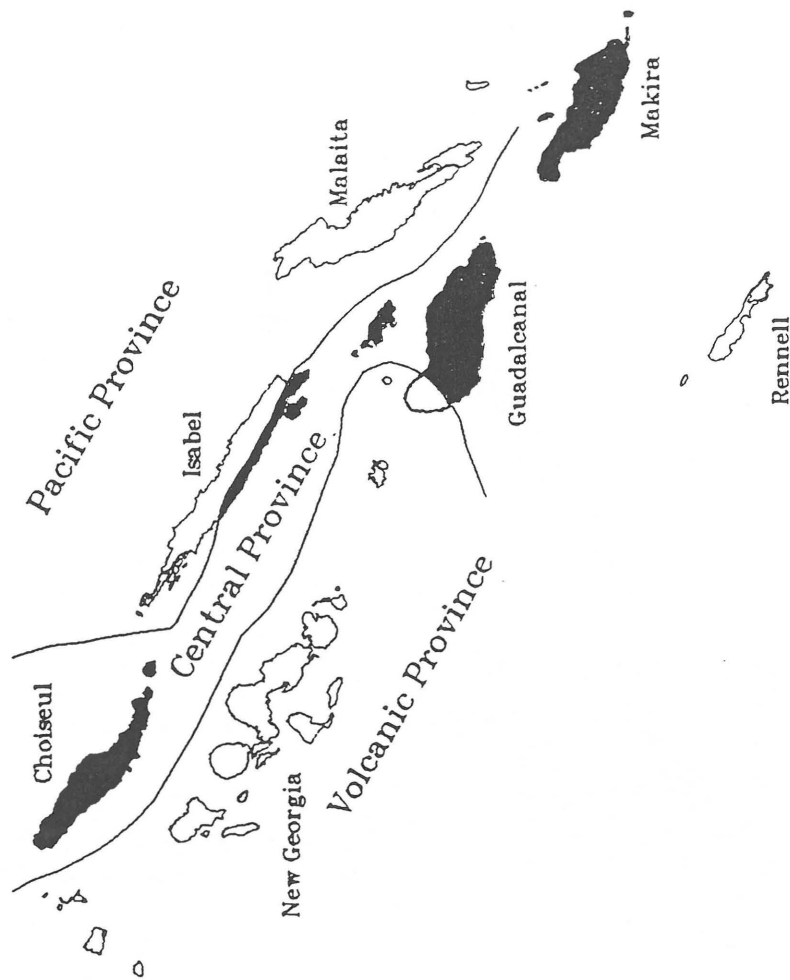


Figure 3. Generalised geology of the Solomon Islands.

after: Falvey et al. (1991) cited in Aldrick (1993).

Geological Provinces

Solomon Islands National Forest Resources Inventory



Kilometres
0 20 40 60 80 100 150 200 250

Figure 4. Geological Provinces of the Solomon Islands.

Indio-Australian crustal plate, causing the subduction of the Pacific plate. Sea-floor spreading occurred between the collision zone and Australia and a complex arc reversal resulted in a section of the Indio-Australian plate breaking away and forming an independent but small sectional plate between the Pacific plate and the Indio-Australian plate, referred to as the Central Geological Province (Figure Four). The Indio-Australian plate or Volcanic Province was then subducted below this detached section with the Pacific plate, Pacific Province arcing upwards over it. Table One and Figure Four show that metamorphic and intrusive rocks occur only in the Central Geological Province (on the island groups of Choiseul, Isabel, Guadalcanal and Makira).

An Atoll Province composed of upraised coral reefs is also recognised by Hackman (1973) and is not related to the Solomons arc reversal. This includes the islands of Rennell and Bellona, Indispensable Reefs, Ontong Java and Sikiana.

The Santa Cruz Islands have geologic features which may be related to the Volcanic Provinces of the Solomons. However, bathymetrically they are related to the Vanuatu group of islands rather than to the Solomons.

3.3 SOILS

Lee (1969) noted five broad soil groups in the Solomon Islands:

soils derived from basalt and other basic igneous rocks;

soils derived from andesite i.e. resembling the basalt soils but with higher magnesium content;

soils derived from limestone;

soils derived from serpentine;

soils derived from other sedimentary rocks.

These broad soil groups as indicated by Lee (1969) are closely related to the parent rock material (Figure Three). Lee also observed that soils from igneous and ultrabasic metamorphic rocks have been grossly weathered, resulting in the loss of much of the more readily leached constituents and relatively extreme accumulation of oxides, principally of aluminium, iron and titanium. He further indicated that rendzinas are found on recently exposed coral limestone, but older limestones have strongly leached soils resembling those found on basic igneous rocks. Hansell & Wall (1976) undertook extensive soil sampling throughout the Islands and adopted the USDA system of classification for soils of the island group. Soil descriptions and analyses for each of the major islands can be found in their series of publications.

4. VEGETATION COMMUNITIES

Walker (1948), who first described the vegetation of the Solomons in a systematic fashion, divided the vegetation initially into two groups, namely littoral forest and inland forest. The littoral forest was further sub-divided into beach forest and mangrove forest, and the inland forest into primary inland forest (including lowland and foothill forest, freshwater swamp and mountain forest) and secondary forest and open grassland.

Whitmore (1969b) segregated the Solomon Islands vegetation into lowland forest, montane forest, grasslands and heaths. Apart from describing a typical lowland forest, six lowland forest variants were identified which included valley forest, freshwater swamp forest, mangrove forest, beach forest, forest on ultrabasic rock and depleted forests.

Hansell and Wall (1976) classified the vegetation in the Solomons using aerial photographs and a limited truthing by ground survey. The forest type classifications were extensive, and at times difficult to use as an ecological system of classification. This was due to the lack of extensive floristic analysis on the ground and the use of canopy density, substrate types and slope classes combined with the classification systems of Burt Davy (1938) and Heylingers (1967) often resulting in an aggregate name for the vegetation type. This gave a classification in which 11 **vegetation communities** and 47 **types** were identified. The vegetation communities identified were:

- (i) **Grasslands and Heaths** of three variants i.e. *Themeda-Imperata*, mid-height grassland, *Themeda*-fern, low to mid-height grassland, and Heaths;
- (ii) **Saline swamps** of two variants i.e. Mangrove swamps and *Phragmites* swamp;
- (iii) **Mixed herbaceous swamps**;
- (iv) **Palm swamp** containing Sago swamp of *Metroxylon solomonense* or *M. sagu*;
- (v) **Pandan swamp**;
- (vi) **Swamp forest** containing four variants i.e. Mixed swamp forest, *Terminalia* swamp forest, *Camptosperma* swamp forest, and *Casuarina* swamp forest;
- (vii) **Lowland rainforest** containing a number of variants;
- (viii) **Beach forest**;
- (ix) **Mixed deciduous forest**;

(x) **Upland forest** of three variants i.e. *Eugenia* spp/*Callophyllum pseudovitiense* dominant forest as on Makira at 550-760 m, *Dacrydium/Eugenia* dominated forest as on Santa Isabel at 1,100 m, and *Sphagnum* bog apparently confined to Mt. Popomanaseu at 2,330 m;

(xi) **Pioneer and successional vegetation formations** of nine variants i.e. Fallow gardens, Cyclone damaged forest, *Kleinhovia-Bambusa* regrowth, *Hibiscus-Polytoca* zone, *Casuarina* woodland, *Commersonia-Trichosperma* low woodland, Pandan thicket, *Canavalia-Ipomea pes-caprae* vegetation and *Mimosa-Paspalum* pioneer scrub community.

The 47 vegetation types classified by Hansell and Wall (1976) are listed in Table Two, Appendix One, under their respective vegetation communities, showing the land area covered by each of them. The land area covered by each community provides an idea of the rarity of the communities and their possible susceptibility to catastrophic disturbance (e.g. cyclones, human activities such as gardening and logging, mud slides, flooding, etc.).

Dahl (1980) listed thirteen vegetation types in the Solomons, namely.

(i) **Lowland rainforest** containing ten associations:

Kauri forest (*Agathis macrophylla*) on Vanikoro and Hdendi Island of Santa Cruz;

Camptosperma forest - possibly late stage following cyclonic disturbance;

Callophyllum kajewskii forest on Gizo (now mostly logged);

Dillenia/Callophyllum/Camptosperma forest on New Georgia and Kolombangara;

Dillenia-dominated forest;

Terminalia calamansanai/Camptosperma/Callophyllum forest on northern Kolombangara;

Pometia/Vitex/Callophyllum forest on coastal areas and inland Guadalcanal;

Vitex dominated forest on Tetepare;

Casuarina papuana forest of high ridges;

Terminalia sepicana/Elaeocarpus/Endospermum forest on Rennell Island;

(ii) **Montane rainforest** of mixed species with indistinct zonation and possibly of several types on upper slopes of Kolombangara and Vangunu;

(iii) **Cloud forest** present on mountain peaks;

(iv) **Riverine forest** containing *Dillenia ingens*;

(v) **Swamp forest** of three associations:

sago swamp forest of *Metroxylon salomonense*;

Terminalia brassii forest;

mixed species swamp forest;

(vi) **Mangrove forest** containing two associations:

tall mangroves of *Rhizophora*, *Bruguiera*,
Dolichandrone spp;

low mangroves of *Rhizophora*;

(vii) **Atoll/beach forest**;

(viii) ***Casuarina* dominated Woodland**;

(ix) **Scrub variant** of the *Casuarina* woodland on San Jorge;

(x) **Serpentine vegetation** forming woodlands on the ultrabasics of southern Santa Isabel, San Jorge, southern Choiseul, Guadalcanal, Florida and Makira;

(xi) **Dwarf-shrub heath** on Nggatokai and other locations which is characterised by open or closed communities of mainly evergreen shrub and often contains a moss or lichen understorey;

(xii) **Grasslands**;

(xiii) **Freshwater marsh** characterised by herbaceous communities on periodically or constantly waterlogged ground and may contain a few woody plants. Plants such as *Carex*, *Juncus*, *Cyperus* and *Scirpus* sp may be common.

Henderson and Hancock (1988) divided the vegetation into five formations based on floristics, structure and physiognomy. These included; grassland, swamp, lowland rainforest, montane forest and secondary forest.

The SOLFRI has also used a classification of forest types based on photo types obtained from air photograph interpretation. The six major types are: **Montane Forests, Hill Rain Forest, Lowland Rainforest, Freshwater Swamp and Riverine Forests, Saline Swamp Forests and Non Forest areas**. These are further subdivided using canopy density, crown cover and canopy height to obtain a total of about 210 vegetative types.

A revision of the plant communities provided by Whitmore (1969b) Walker (1948) Pendleton (1949) Henderson and Hancock (1988) is summarized below.

4.1 LOWLAND FORESTS

4.1.1 A Typical Lowland Forest

Walker (1948) noted that well over 100 tree species in the Solomons can be regarded as large canopy trees. Of these only ten were found to exceed a girth of two metres and were either locally abundant or confined to specific habitats or islands. These were: *Pometia pinnata* (widespread) *Vitex cofassus* (widespread but only locally abundant) *Callophyllum* spp (widespread but mainly ridge forest) *Maranthes corymbosa* (formerly *Parinarium corymbosum*) (widespread but mainly ridge forest) *Gmelina salomonensis* (widespread) *Terminalia* spp (widespread) *Agathis macrophylla* (restricted to ridges and spurs on Santa Cruz) *Camptosperma brevipetiolata* (restricted to the western Solomons and Santa Cruz on low lying ground) *Dillenia salomonensis* (formerly *Wormia salomonensis*) (restricted to mainly ridge forest) and *Syzygium onesimum* (restricted to the western Solomons). Walker (1948) was not primarily concerned with understorey tree species but did note the widespread nature of *Securinega samoana*, *Parinari glaberrimum* (formerly *Parinarium glaberrimum*) *Syzygium* spp, *Garcinia* spp, *Myrtaceae* and *Gnetum gnemon*.

Twelve trees species were also identified by Whitmore (1969b) as common in the canopy layer in the lowland forests, namely: *Callophyllum kajewskii*, *C. vitiense*, *Camptosperma brevipetiolatum*, *Dillenia salomonensis*, *Elaeocarpus sphaericus*, *Endospermum medullosum*, *Gmelina moluccana*, *Maranthes corymbosa*, *Parinari salomonensis*, *Pometia pinnata*, *Schizomeria serrata* and *Terminalia calamansanai*. Only sixty other large trees over 2 m girth were found by Whitmore (1966, 1969b) to be common throughout the Solomons. These have been listed in Appendix One, Table Three.

Whitmore (1969b) found that the structure of the forest is quite distinct from the South-East Asian example. The canopy was found to attain a height of 30-45 m and is interrupted by vine-covered clearings and small tree thickets reaching six metres in height. The only emergents were found to be *Terminalia calamansanai* and the strangling and banyan figs (*Ficus virgata*, *F. glandulosa*, *F. obliqua*, *F. benjamina* and *F. subcordata* respectively). This is in contrast to west Malesia where the tree canopy may reach 45 to 60 metres in height and a number of emergent general are common. Species density, size and diversity of large trees were also found by Whitmore (1969b) to be considerably less than the Asian example. A

comparison with the Malaysian studies showed that the Solomons on average had half the number of large trees (> 180cm girth) per hectare and a third greater number of smaller trees over 30 cm girth, with the larger trees approximately a third as tall as their Malay relatives. This suggests that the standing biomass of the Solomons forests is less than that of the western Malesia forests.

The lower tree layers in the Solomons were also found by Whitmore (1969b) and Schmid (1989) to contain an abundance of the pachycaul treelets as compared to western Malesia. These are unbranched treelets of palm-like appearance commonly with crowns of large leaves which are considered to be a primitive group (Whitmore 1969b). Common examples are *Barringtonia papeh*, *Boerlagiodendron* spp, and *Ficus* spp of sect. *Sycocarpus*, *Leea indica*, *Piper wickmanii*, *Tapeinosperma cristobalense*, *T. pachycaulum*, an undescribed *Cyrtandra*, (Whitmore, 1969b) *Schefflera* spp, *Dysoxylum* spp and *Meryta* spp (Schmid 1989). Whitmore (1969b) suggests that intensive competition from other tree species in western Malesia has meant the rarer occurrence of this group in that floral region and common appearance in the Solomons where competition is less. Whitmore's findings indicate that the flora of the Solomons, although being semi-continental in composition, is dis-harmonic, i.e. taxonomically unbalanced.

Climbers and epiphytes were also found by Whitmore (1969b) to be considerably more abundant than in West Malesia. These were commonly noted to partially or completely cover tree trunks, and were most abundant along rivers but increasing inland where elevation was higher.

Aroids were also found to be conspicuous and almost in an abundance similar to South American forests. Common aroid species include *Epipremnum amplissimum*, *E. dahlii*, *E. nobile*, *Pothos hellwigii*, *P. rumphii*, *Rhaphidophora korthalsii*, *R. novo-guineensis*, *Scindapsus altissimus*, *S. salomonensis*, *Spathiphyllum commutatum*, and *S. salomonense*. The climbing pandan *Freycinetia* spp and the fern genus *Staenochlaena* are abundant in the lowlands with *Freycinetia* spp increasing with altitude to be the dominant climber. Large epiphytes such as *Asplenium*, *Hydnophytum* and *Myrmecodia* are also conspicuous and smaller epiphytes such as bryophytes and filmy ferns increase with altitude (Whitmore 1969b).

Large areas of lowland forest on Isabel, New Georgia and Choiseul are dominated by a single species, namely, *Camposperma brevipetiolatum*, *Burckella obovata*, *Gmelina moluccana* and *Pometia pinnata* (Henderson and Hancock 1988) and may be a response to severe cyclone damage or old garden activity. Species such as *Albizia salomonensis*, *Archidendron oblongum* and *Planchonella thyroidea* which respond to topography, soils and drainage are found only in alluvial valleys.

4.1.2 Valley forests

Walker (1948) described a forest variant common along river banks, referred to as a riverine forest type. This was said to contain a mixture of species from the lowland and swamp forests. The large trees characteristic of this forest include: *Pithecelobium* spp, *Spondias dulcis*, *Dysoxylum* spp, *Albizia salomonensis*, *Sterculia* spp, *Octomeles sumatrana*, *Myristica* spp, *Nauclea orientalis*, *Horsfieldia* spp, *Erythrina fusca*, *Bischofia javanica*, *Cananga odorata*, *Terminalia brassii*, *Pterocarpus indicus*, *Dolichandrone spathacea*, *Garuga*

floribunda, *Euodia elleryana*, *Serianthes minahassae* and the smaller trees: *Syzygium*, spp *Buchanania* spp and *Gmelina* spp.

A forest containing almost pure stands of *Mangifera salomonensis* is also found in very restricted locations along the Tenaru river on Guadalcanal and possibly on Malaita (Walker 1948). Since Walker recorded these stands of endemic mango, forestry operations have substantially reduced them.

Whitmore (1969b) also found a high canopied forest associated with valley depressions containing a lowland forest variant, of distinctive structure and floristic composition. It was found to contain tree species solely confined to these valley locations, namely *Albizia salomonensis*, *Archidendron oblongum* and *Planchonella thyroidea*. These valley areas may also support a dense low scrub reaching three to nine metres high and proposed by Whitmore (1969b) to be due to previous cultivation or destructive flooding. Tree species such as *Hibiscus tiliaceus*, *Kleinhovia hospita* and *Macaranga* spp are common components of these scrubs which provide excellent conditions of growth for the palms *Areca macrocalyx*, *Heterospatha* spp and *Rhopaloblaste elegans*; giant herbs such as *Heliconi indica*; gingers *Catimbium novae-pommeraniae*, *Costus speciosus*, *Guillainia pupurata* and *Tapeinochilus* sp and the *Marantaceae* *Cominsia gigantea*, *C.guppyi* and *Donax cannaeformis*.

4.1.3 Mixed Deciduous Forests

Pendleton (1949) recognized a distinct forest type which occurred along streamsides in the grasslands of eastern Guadalcanal which contained a small number of deciduous trees. Whitmore (1969b) noticed that these communities contained trees which also grew in the drier areas of Indonesia, New Guinea and Australia, namely *Garuga floribunda*, *Gyrocarpus americanus*, *Melia dubia* and *Schleinitzia novo-guineensis*. Henderson and Hancock (1988) also noticed that palms are particularly common, especially *Calamus* spp, *Rehderophoenix subdisticha* and *Strongylocaryum latius*.

Variation in the structure and composition of this type of forest is related to the nature of the stream i.e. whether it is ephemeral or permanently flowing. There may be several strata near permanently flowing streams while ephemeral streams have two layers or even one only. Along the larger rivers this vegetation is nearly as complex as that found elsewhere in the lowland rainforests and is often indistinguishable from it. The forest along the smaller streams influenced by the drier conditions of the rainshadow develops distinctive features.

The forest growing along constant streams usually has the following strata:

Ground layer which seldom exceeds one metre in height;

Shrub-tree layer of woody or herbaceous plants greater than one metre in height but not exceeding 10 metres;

Second strata tree layer of trees over 10 metres but not exceeding 27 metres; and

Primary tree layer of large trees which may reach a height of 50 metres (Pendleton, 1949).

In those streamside communities that grow along ephemeral streams the strata usually lacks a primary tree layer causing the canopy to be lower and intermittent in nature (Pendleton, 1949).

The primary layer is composed of trees reaching a height of 30-50 m and may contain: *Pterocarpus indicus*, *Celtis kajewskii*, *Myristica platyphylla*, *Intsia bijuga*, *Canarium* spp, *Horsfieldia novo-guineensis*, *Alstonia spectabilis*, *Campnosperma brevipetiolata*, *Pometia pinnata*, *Elaeocarpus floridanus*, *Rhus taitensis*, *Spondias pinnata*, *Terminalia solomonensis*, *Syzygium sumarangense*, *Mangifera minor*, *Inocarpus edulis* and *Callophyllum solomonense* (Pendleton, 1949).

The second canopy layer is composed of *Erythrina variegata* which may form pure stands, *Artocarpus communis*, *A. altilis*, *Cerbera manghas*, *Barringtonia* spp, *Areca* and *Melia* sp; all of which may be associated with the edges of these communities while *Hedycarya solomonensis*, *Harpulia arborea*, *Colona scabra*, *Cananga odoratum*, *Parinari glaberrimum*, *Trema orientalis*, *Litsea perglabra*, *Kleinhovia hospitata*, *Dysoxylum caulostachyum*, *Trichospermum psilocladum*, *Cordia* sp, *Horsfieldia salomonensis*, *Sterculia* sp and *Antidesma* are found further away from the edges (Pendleton, 1949).

The shrub-small-tree layer may contain: *Hibiscus tiliaceus*, *Pipturus incanus*, *Pandanus* sp, *Morinda citrifolia*, *Kleinhovia hospita*, *Macaranga tanarius*, *Trema aspera*, *Uncaria* sp, *Melochia indica*, *Solanum vitiensis*, *Breynia* sp, *Vitex negundo*, *Areca catechu*, *Areca* spp, *Ehretia microphylla*, *Amaracarpus solomonensis*, *Buchanania solomonensis*, *Goniothalamus grandiflorus*, *Barringtonia magnifica*, *Syzygium nutans*, *Aglaia nudibacca*, *Euodia hortensis*, *Psychotria schmielei*, *Cassia javanica*, *Licuala* sp, and *Clerodendron buehneri* in more shaded places. Streamside communities may also contain *Carica papaya*, *Ricinus communis*, the bamboo *Schizostachyum* sp, and palms such as *Caryota rumphiana* and *Areca* sp, in addition to the giant herbs, *Alocasia macrorrhiza*, *Costus sericeus*, *Globocha marantina* and *Musa paradisica* (Pendleton, 1949).

Where light is adequate the ground layer may be composed of: *Nephrolepis biserrata*, *Lygodium* sp, *Dryopteris* sp, *Selaginella caudata*, *Vernonia cinerea*, *Centotheca latifolia*, *Digitaria microbachne*, *Pennestum macrostachyum*, *Oplismenus compositus*, *Colcasia esculenta*, *Tacca pinnatifida*, *Ipomoea batatas* (Pendleton, 1949).

The lianes in this community may include: *Calamus holrunggii*, *Freycinetia* sp, *Rhaphidophora* sp, *Mucuna gigantea*, *Derris trifoliata*, *Cissus assamica*, *Cayratia trifolia*, *Salacia prinoidea*, *Parsonsia lata*, *Strychnos* sp, *Allophylus leptococcus* as well as species of the family Celastraceae. The climbers of the forest edge are also of a distinct grouping and may include: *Cucumis sativa*, *Passiflora foetida*, *Ipomoea congesta*, *I. gracillis*, *Mucuna urens*, *Benincasa hospita*, *Cassythe filiformis*, *Calamus* sp, *Lygodium* sp, *Freycinetia* sp, *Luffa cylindrica*, *Araceae* and others (Pendleton, 1949).

The epiphytes are often confined to trees bordering the streams and may be absent or of different composition where the streams are ephemeral. The composition of the species was found to be similar to that in the strand community although the boles of the streamsides may be covered in mosses. The ant plants *Myrmecodia salomonensis* and *Hydnophytum stewartii*

are confined to large trees along permanent streams and are rarely seen on smaller trees or along ephemeral streams. The bird nest ferns *Asplenium macropyllum* and *A. nidus* occur commonly at the bases of mountains where permanent streams and swamps are found (Pendleton, 1949).

Henderson and Hancock (1988) also noticed that this forest had a high proportion of small trees including: *Cananga odorata*, *Colona scabra* and *Semecarpus* spp; but with *Buchanania arborescens*, *Kleinhovia hospita*, *Pometia pinnata* and *Vitex cofassus* common in the canopy.

4.1.4 Freshwater Swamp Forests

Henderson and Hancock (1988) indicated that 4.1% of the Solomon Islands land area is covered by freshwater swamp forests.

Walker (1948) noted five variants in the freshwater swamp forests of the Solomons. These were:

stands of small trees usually of *Callophyllum cerasiferum* or *Syzygium* spp where the water is deep and stagnant;

almost pure stands of *Callophyllum kajewskii* where the water is shallow and fresher and where broken coral appears near the soil surface (Walker, 1948);

pure stands of *Terminalia brassii* forest in moderately deep swamp with no stagnant water. These are often near the strand forest of the coast and the understorey is usually sparse, containing small trees of *Callophyllum cerasiferum* (Walker 1948). Whitmore (1969b) found almost pure stands of *Terminalia brassii* occupying areas of up to 1 sq km along coastal locations. These trees often reached a height of 40 m and developed large hanging masses of aerial roots at and above the watertable. This *Terminalia* is also found growing as a narrow consociation of a few trees wide along river valleys (Whitmore, 1969b);

stands of *Metroxylon solomonensis* in areas containing rich humus and occurring as pockets in swamps with better drained areas. They may also occur on the tops of flattened ridges where changes in gradient provide similar conditions; and

stands of *Campnosperma brevipetiolata* occur in the western Solomons in low lying land interspersed with shallow swamp, but may also be common in restricted areas on slopes (Walker, 1948).

Henderson and Hancock (1988) on the other hand, noted four major variants in the swamp forest which included: **mixed herbaceous, palm, pandan and swamp forest**. Of the latter they recognized two distinct communities, namely, 'mixed species swamp forest' and 'single species swamp forest'. The mixed species swamp forest occurs where the soil is waterlogged or very poorly drained and is commonly composed of tree species such as *Barringtonia* spp, *Callophyllum vitiense* (mis-identified as *C. vexans*) and *Pterocarpus indicus*. The canopy was

said to be broken and uneven and the lower tree layers are dominated by large numbers of small trees and saplings. The shrub layer is composed of seedlings: aroids, pandans, climbers and epiphytes such as *Stenochlaena* spp and *Raphidophora* spp are common. In the single-species swamp forest *Camptosperma brevipetiolata*, *Casuarina papuana* and *Terminalia brassii* may be dominant (Henderson and Hancock, 1988).

4.1.5 Mangrove Forests

Henderson and Hancock (1988) indicated that 2.3% of the land area of the Solomons is covered in mangrove communities with the largest areas being found along the coasts of Isabel, Malaita, and New Georgia, as well the eastern ends of Guadalcanal and Makira.

The mangrove flora is typically Malesian in composition. Many species such as *Nypa* spp, *Bruguiera parviflora*, *B. seangula*, *Rhizophora apiculata* and *Ceriops tagal* reach their eastern limit in the Solomons and other species found in eastern Malesia such as *Bruguiera cylindrica* and *Ceriops decandra* are absent (Whitmore 1969b) and poor in composition (Henderson and Hancock 1988). A common mangrove, *Lumnitzera littorea* may form extensive pure stands in some locations (Whitmore 1969b).

The most widespread mangroves in the Solomons are *Bruguiera* spp and *Rhizophora* spp while *Avicennia* may be of scattered occurrence. In areas which are submerged and are at the seaward side, such as coral platforms, the soil may vary from deep peat to coral debris. In these locations *Rhizophora apiculata* is dominant while nearer the shore where the soil surface is exposed at low tide, mixed stands of *R. apiculata* and *R. stylosa* are found, and may be in association with *Bruguiera* spp. Other common trees which may form a canopy to 25 m in these locations include *Ceriops tagal*, *Dolichodrone spathacea* and *Lumnitzera littorea*. Further inland where the salt levels begin to decrease, the tree composition changes from dominance by *Sonneratia* spp and *Xylocarpus granatum* to a mixture of *Callophyllum inophyllum*, *Fagraea racemosa*, *Heritiera littoralis*, *Intsia bijuga* and *Pandanus* spp with the ferns and the shrub *Acanthus ebracteatus* over a thin herb layer.

Walker (1948) indicates that a narrow transition zone between the mangrove forest and the inland forest is a feature of this forest type in the Solomons. The genus *Avicennia* (represented in the Solomons by five species) which is considered a typical coloniser in new formed mud areas elsewhere in the Malaysian region, was found by Walker (1948) to have a scattered occurrence and is often found merely as a 'relic' in coastal forests where there is a transition zone between the mangrove forest and the inland forest. Behind the scattered *Avicennia* zone and lining creeks and in deep mud, *Rhizophora apiculata* and *R. mucronata* are commonly found (*R. apiculata* was mis-identified as *R. conjugata* by Walker, 1948). *Bruguiera* also becomes the dominant genus behind the coastal fringe commonly forming pure stands under which *Ceriops tagal* is found. The transition zone between the mangrove and inland forests may also contain *Sonneratia casseolaris*, *Heritiera littoralis*, *Xylocarpus granatum* and *Lumnitzera littorea* as co-dominants. *Lumnitzera* may also form pure stands of large trees but this is rare as environmental conditions are limiting for this genus. Where the transition forest is particularly badly drained, pure stands of *Dolichandrone spathacea* may be found; a species often found growing along inland river courses. The palm *Nypa fruticans* which is typically dominant along the waterways adjoining mangroves elsewhere in Malesia is also rare in the Solomons (Walker, 1948).

Pendleton (1949) found that mangroves on Guadalcanal were associated with relatively large streams that form deltas or intermittent streams where beach bars block the entrance to the sea. *Rhizophora apiculata* (mis-identified as *R. mucronata* by Pendleton, 1949) which is the most common mangrove in the Solomons (Pendleton, 1949; Henderson and Hancock, 1988) and *Brugiera conjugata* were found to be the dominant mangroves on Guadalcanal with *Brugiera sexangular* forming small stands reaching a height of 20 m at river mouths, with *Rhizophora mucronata* where the water is less saline (Pendleton, 1949). *Xylocarpus granatum*, *Sonneratia lanceolata* and *Nypa fruticans* which are less tolerant of salt, are most often found inland behind *Rhizophora* and *Brugiera*. Trees associated with the strand and streamside floras are also found at the edges of mangroves, namely; *Cerbera manghas*, *Callophyllum* spp, *Barringtonia racemosa* and *Brownlowia argenta*. The fern *Acrostichum aureum* is often associated with the mangroves while *Cycas rumphii*, *Scirpodendron ghaeri*, *Premna* spp, *Dianella ensifolia*, *Cyperus umbellatus*, *Fimbristylis diphylla*, *Wedelia biflora*, many species of *Zingiberaceae*, *Poaceae* and others are found at the borders of swamps. Epiphytes on mangroves are confined to protected sites and include mosses, ferns, myrmecophytes (ant plants) and orchids. Among the epiphytes are: *Myrmecodia salomonensis*, *Hydnophytum* spp, *Hoya* spp, *Dendrobium veratrifolium*, *Polypodium punctuatum* and *Davallia* spp (Pendleton, 1949).

4.1.6 Beach Forests

The floral composition of the beach forest is typical of that found throughout the Indo-Malesia region. This forest is found fringing the major islands, coral atolls and raised reefs and commonly contains the tree species: *Barringtonia asiatica*, *Callophyllum inophyllum*, *Casuarina equisetifolia*, *Cerbera* spp, *Cordia subcordata*, *Cynometra ramiflora*, *Desmodium umbellatum*, *Heritiera littoralis*, *Hernandia sonora*, *Hibiscus tiliaceus*, *Inocarpus fagiferus*, *Intsia bijuga*, *Messerschmidia argentea*, *Planchonella obovata*, *Premna corymbosa* and *Scaevola* spp (Whitmore, 1969b). Apart from these, Walker (1948) listed *Hernandia peltata*, *Casuarina equisetifolia*, *Thespesia populnea*, *Pemphis acidula*, *Guettarda speciosa* and *Ochrocarpos obovatus* as common, and Thorne (1969) also mentioned *Sebastiania chamaelea* in this community. Henderson and Hancock (1988) added *Diospyros* spp, *Ficus austrina*, *Hibiscus tiliaceus*, *Kleinhovia hospita*, *Morinda citrifolia* and *Premna corymbosa* with palms uncommon in the shrub layer where *Pandanus* sp and gingers are plentiful. Orchids and epiphytes are also common on the trees of this forest type (Henderson and Hancock, 1988).

On the island of Guadalcanal Pendleton (1949) recognized three strand flora formations i.e. ***Terminalia-Callophyllum*** association, ***Barringtonia-Callophyllum*** association and the **mangrove association**, the latter of which is discussed separately.

***Terminalia-Callophyllum* association**

In the *Terminalia-Callophyllum* association the dominant large trees growing to 20 m included: *Terminalia catappa*, *Callophyllum inophyllum*, *Cerbera manghas*, *Cocos nucifera*, *Heritiera littoralis*, *Pongamia pinnata*, with *Barringtonia asiatica* as an occasional. *Ficus* spp were also found to be common in rocky areas where sand was absent. Other typical strand trees were also common. The understorey was found to be composed of *Hibiscus tiliaceus*, *Pandanus tectorius*, *Guettarda speciosa*, *Thespesia populnea* and *Desmodium umbellatum*.

The herbaceous ground layer is composed of *Ipomoea pes caprae*, *Emilia sonchifolia*, *Euphorbia hirta*, *Triumfetta bartramia*, *Wedelia biflora*, *Canavalia maritima* and *Momordica charantia*. The latter two plants form tangles in the shrubs and ground herbs found growing in this association. Occasionally, large lianes of the family *Celastraceae* are also present and the climbing aroid, *Rhaphidophora* sp is found where the stands are dense (Pendleton 1949).

Pendleton (1949) notes that in the rainshadow areas of Guadalcanal where rainfall is considerably reduced, the strand association generally has fewer species and trees are reduced in size and contain only a few epiphytic species. Epiphytes become frequent only in the rainshadow area at the mouths of streams by providing higher moisture levels in the air. The association is also described as noticeably distinct from other strand communities throughout the Solomons due primarily to the lower rainfall (Pendleton, 1949).

***Barringtonia-Callophyllum* association**

In coastal areas of Guadalcanal which are composed of solid coral limestone topped with sandy soil or coarse gravel a strand flora develops, dominated by *Callophyllum inophyllum* and *Barringtonia asiatica*, which may form almost pure stands. On the gravel areas a mixed littoral forest develops with no tree species predominating but with *Callophyllum* being common. *Ficus* spp reaching a height of 60 m are also scattered through the stand and are often found near the water's edge. Tree species also common to this part of the strand are *Cocos nucifera*, *Terminalia catappa*, *Erythrina variegata*, *Parinari* sp, and *Hernandia ovigera*. The smaller trees and shrubs include: *Thespesia populnea*, *Hibiscus tiliaceus*, *Pandanus* sp, *Scaevola frutescens*, *tournefortia argentea*, *Guetardia speciosa* and *Casuarina equisetifolia*. Climbers in this association include *Rhaphidophora* and other aroid climbers, *Mucuna brachycarpa*, *M. gigantea*, *M. elegans* and *Derris trifoliata*. The herb layer includes *Ipomoea pes caprae*, *I. gracillis*, *Vigna marina*, *Borreria articularis* and *Canavalia maritima* as well as the weeds *Emilia sonchifolia* and *Wedelia biflora* and the grasses *Digitaria microbachne*, *Panicum reptans* and *Eragrostis amabilis*. Epiphytes are numerous in this strand flora and include: *Myrmecodia* and *Hydnophytum* spp, *Polypodium sinuosum*, *P. punctuatum*, *Drynaria quercifolia*, *Asplenium macrophyllum*, *Cyclophorus lanceolatus*, *Dendrobium veratrifolium*, *D. hispidum* and *Sarchochilus moorei* (Pendleton, 1948).

4.1.7 Forest on Ultrabasic Rock

This is a distinctive forest type which occurs where ultrabasic rocks (rich in nickel and chromium) are found (Whitmore, 1966, 1969). The largest areas are located on Santa Isabel, San Jorge and southern Choiseul with smaller areas occurring on Guadalcanal at Marau and Wanderer Bay and on Makira and the Florida Islands (Whitmore, 1969b).

This forest is described as being of lesser height and poorer in species than normal tropical rainforest (Whitmore 1966, 1969b) and, except on Choiseul, is often dominated by extensive stands of *Casuarina papuana* or *Dillenia crenata*, and a few species which are found scattered through the other forests. Four species were identified as being restricted to the ultrabasics by Whitmore (1966, 1969b) namely *Galubia hombronii*, *Myrtella beccarii*, *Pandanus lamprocephalus* and an undescribed *Xanthostemon* while Henderson and Hancock (1988) indicated that *Burckella obovata*, *Dacrydium* spp, *Eugenia* spp, and *Fagraea*

gracilipes also occurred in the tree layer while *Saranga sinuosa* was present in the shrub layer with the climbers *Freycinetia* and *Flagellaria*.

4.1.8 Depleted Forest

Whitmore (1969b) noticed that forest areas surrounding villages had a depleted appearance. These forests possessed a distinctive structure due to the removal of many palms, small trees and climbers for use in construction, twine and other uses. This often occurs for a few kilometres around a village and the forest has an open appearance with large trees and a herb layer often containing gregarious stands of *Selaginella* spp, but with the lower tree levels of the forest removed. Trees of open and secondary forest may also be present where the upper canopy has been disturbed (Whitmore, 1969b).

4.2 MOUNTAIN FORESTS

4.2.1 Mid-Mountain Forests

Walker (1948) and Pendleton (1949) recognized two mountain forest types in the Solomons which were 'mid-mountain' forest and 'high' mountain forest or mossy forest. Walker (1948) further divided the mid-mountain forest into forests containing *Agathis macrophylla* restricted to Santa Cruz; *Casuarina papuana* or *Gymnostoma mesostrobilum* forest (misidentified as *Casuarina nodiflora*) often in pure stands, and those containing a variety of other species usually with *Syzygium* in the understorey.

Both Walker (1948) and Pendleton (1949) note that the mid-mountain forest of the foothills contains trees which tend to be reduced in size, often containing only two storeys. This forest often cannot be clearly defined (Walker, 1948; Whitmore, 1969b) and may even reach down to altitudes of less than 65 m on basalt soils which are very thin (Walker, 1948). Pendleton (1949) indicated that on the island of Guadalcanal this forest belt is found on slopes between 270 to 500 m elevation and may differ in composition from the lower forests containing smaller tree species such as: *Litsea solomonensis*, *Commersonia bartramia*, *Garcinia solomonensis*, *Colona velutina*, *Canthium karrense*, *Gnetum gnemone*, *Ficus* sp, *Psychotria* sp, *Breynia cernua*, *Fagraea solomonensis* while *Saurauia conferta*, *Medinilla cephalantha* are abundant in the gullies. The lianes are also common such as *Freycinetia* sp, *Carruthersia brassii*, *Uncaria philippinensis*, *Hippocratea* sp and other common vines of the lowlands.

4.2.2 Lower-montane Forests

Whitmore (1969b) reported that as a result of the compression of the vegetation zones and the absence of a number of plant groups, no conspicuous lower montane zone can be found in the Solomons. The notably absent species in the lower montane areas (1,200 to 2,300 m) as compared to New Guinea include *Nothofagus* spp, *Castanopsis* spp, *Engelhardia* spp and *Araucaria* spp (Whitmore, 1969b).

Earlier, Pendleton (1949) had recognized a lower montane zone between 1,000 and 1,330 m on Guadalcanal which contained:

- * **the large trees:** *Myristica solomonensis*, *M. kajewskii*, *Sterculia* sp, *Polyosma macrobotrys*, *Ficus* sp, *Sloanea insularis* and *Elaeocarpus* sp;
- * **the medium size trees:** *Dacrydium magnum* (mis-identified as *D. xanthandrum*) *Astronidium muscosum*, *Pygeum schlechteri*, *Astronidium montanum*, *Alphitonia* sp, *Perrottetia molucana*, *Mastixia philippinensis*, *Tridiaspernicum kajewskii*, *Euodia radlkoferiana*;
- * **an abundance of the small tree species:** *Parasponia paucinerria*, *Coulthovia novobritannica*, *Saurania schumanniana*, *Carpodetus amplus*, *Litsea papillosa*, *Belliolum kajewskii*, *Dolicholobium callianthrum*, *Harpullia vaga*, *Leea macropus*, *L. indica*, *Semicarpus decipiens*, *Ficus* sp;
- * **the shrubs:** *Rubus brassii*, *Ceodes umbellifera*, *Dolicholobium kajewskii*, *Ophiorrhiza solomonensis*, *Lasianthus chlorocarpus*, *Bochmeria* sp, *Medinilla rubescens*, *Melastoma polyanthum*;
- * **a greater variety of lianes than at any other altitude.** Common species include: *Strongylodon lucidus*, *Psychotria olivaceae*, *Tetrastigma pergamaceum*, *Cissus simplex*, *Cayratia japonica*, *Tetrastigma* sp, *Rubus moluccanus*, *Chitandropsis novoguineensis*, *Jasminum didymum* and *Medinilla calliantha* var. *bella*.

4.2.3 Upper-montane Forest

The inland forests change rapidly as elevation increases (Walker, 1948; Pendleton, 1949 ; Whitmore, 1966, 1969b) and the altitudinal vegetation zones are strongly compressed compared to the larger mountainous islands of New Guinea and Indonesia (Whitmore 1966, 1969b). This is a common occurrence with isolated mountain ranges, known as the Masserherhebung effect (Whitmore, 1969b). This effect is demonstrated by the presence of 'elfin woodland' as low as 690 m on the crater rim of Vangunu and similarly on Mt Gallego, and the Pagato area of north-east Makira (Whitmore, 1969b) whereas in New Guinea this occurs at 2,300-2,700 m (Whitmore, 1966). Interestingly, Whitmore (1966) comments that this compression of mountain forest zones is most extreme in the Santa Cruz Islands where montane forest elements almost reach sea level. Dennis (pers com) also noticed a similar occurrence on the Island of Santa Anna in eastern Makira and the author notes the structural similarity of forests on Rennell Island to montane communities. As early as 1948, Walker suggested that these higher mountain forests were of great botanical interest.

The species composition of the upper-montane forest is also distinct from that found elsewhere in Malesia as many montane species are absent and in the lowlands a number of species, found exclusively in montane environments elsewhere, is present, e.g. *Weinmannia blumei* and *Metrosideros* on Vanikoro and Santa Cruz Islands (Whitmore, 1969b).

In the upper montane forest (2,200 to 2,500 m) and the subalpine forest (2,500 to 3,500 m) of New Guinea *Podocarpus* spp and *Papuecedrus* spp are replaced at increasing elevation by *Ericaceae* and *Olearia* spp; all these species are absent from the Solomons except the *Ericaceae* which has four endemic epiphytic rhododendrons and a shrub like *Vaccinium*. The prominent group in the mountains of the Solomons is the montane species of *Myrtaceae*

(*Acmena*, *Eugenia*, *Mearnsia*, *Metrosideros*, *Rhodamnia*) and the family is conspicuous in the mountains of New Guinea (Whitmore, 1969b). Whitmore (1969a) suggested that the absence of the New Guinea component in the mountain forests may be due to the formation of the mountains following the submergence of land bridges to the north-west, preventing the migration of this floral component, and that there may have been no high mountains between the Solomons and New Guinea within colonization range to allow migrations when formation of the mountains did occur.

As discussed by Falvey et al (1991) it appears likely that the young nature of the Solomon Islands land surfaces coupled with the distance and isolation from the major source of New Guinea, means that floral migration and invasion is still progressing actively along the island chain. The migration of mountain floras would also be more difficult than in the larger areas of the lowland communities. This is due to the frequently small size of the mountain communities, effectively making them isolated "islands" within a sea of lowland forest and hence a dependence on animal dispersers commonly confined to cooler altitudes, coupled with lower temperature requirements of many of the plant species. One would expect a slower migration rate for the mountain species than for the lowlands. Apart from this difficulty, as indicated by Whitmore (1969a), some of the New Guinea mountain species are present on Mt. Popomanaseu, which apart from the *Myrtaceae* include *Eurrya hellwigii*, *Gahnia javanica*, *Haloragis secunda*, *Hedyotis schlechteri*, *Macaranga lanceolata* and *Polyosoma integrifolia*.

The upper montane forest is sharply zoned and is characteristically mossy with the ground and tree trunks covered in thick masses of bryophytes. Sphagnum bog is known at only one location i.e. the summit of Mt. Popomanaseu and zones of abundant scrambling bamboo (probably *Nastus productus*) grow near the summits (Whitmore, 1969b).

Corner (1969) collected the angiosperm flora of Mt. Popomanaseu above 1,300 m, including many new species and noting that the flora lacked grasses and sedges.

Henderson and Hancock (1988) added that the montane forests contain stunted trees to a height of 7-9 m which form a broken canopy with species *Dacrydium* and *Eugenia* as dominants (*Dacrydium* has not been seen as a dominant on the summit of Mt. Gallego, Rendova or Vangunu by the author, while Corner, 1948, recorded its presence on Mt Popomanaseu). The smaller shrubs were also thought to include *Metrosideros* sp (mis-identified as *Pemphis acidula*, a seaside species) and the bamboo *Racembambos holttumii* while the ferns commonly included *Gleichenia kajewskii* and *Dipteris* spp in association with scrambling pandans (Henderson and Hancock, 1988).

4.3 SECONDARY FOREST

Walker (1948) classified secondary forest into three types: **bamboo forest**, **grasslands** and **secondary tree species**. The bamboo forests and, more particularly, the grasslands were included in this group because constant human disturbance of the forest is required for their formation, especially through the use of fire. The grasslands have been discussed separately.

Henderson and Hancock (1988) indicate that as much as 16% of the land is covered by secondary forest and this is increasing rapidly due to shifting agriculture.

The secondary forest containing tree species in the Solomons is usually associated with greater disturbances such as cyclones and human activity and are characterised by species with rapid growth (Walker 1948). The origins and composition of the secondary flora is indicated by Walker (1948) to be almost exclusively Malesian. His reason for this was the more recent arrival of the secondary species than the primary species from the source areas in Malesia. This would confirm modern theories, as recent studies of the dispersal abilities of various plant groups have shown that secondary species (termed 'r' strategists) are usually quick growing opportunists with high seed production and dispersal ability. Walker (1948) illustrated his findings with the example of the isolated Vanikoro island which lacked secondary forest species. In 1935 and 1939 cyclones ravaged the island and secondary species were found only around areas of human habitation and were evidently recent arrivals dispersed by humans (Walker, 1948). He also recognized three ecological stages in forest regeneration following a disturbance event i.e. tree species inhabiting new clearing (early secondary) older clearings and small to medium in height (mid-secondary) and mature secondary and transition forest (late secondary to early mature). The early secondary species commonly include *Trema orientalis*, *Melanolepis multiglandulosa*, *Macaranga tanarius*, *Homolanthus populneus* and *Leucaena leucocephala*; the mid-secondary species are commonly *Litsea*, *Euodia* and *Colona* spp, *Commersonia bartramia*, *Kleinhovia hospita*, *Melochia umbellata*, *Rhus taitensis*, *Allophylus*, *Zanthoxylum*, *Adenanthera* and *Piptadenia* spp, and the late secondary to early mature species are *Gnetum gnemon*, *Dysoxylum caulostachyum*, *Garuga floribunda*, *Pometia pinnata*, *Albizia*, *Canarium*, *Elaeocarpus*, *Sloanea* and *Alphitonia* spp (Walker, 1948).

Henderson and Hancock (1988) found that a typical succession following abandonment of gardens occurs in four stages, namely:

herbaceous regrowth such as *Paspalum conjugatum* or *Imperata cylindrica* and *Pennisetum macrostachyum* in gardens with short fallow, followed by

development of the pioneer species such as *Acalypha grandis*, *Alphitonia incana*, *Hibiscus tiliaceus*, *Macaranga* spp, *Melochia umbellata*, *Pipturus argenteus* and *Schleinitzia novo-guineensis*, plus a mixture of *Musa* and *Heliconia* spp, followed by

establishment of *Albizia falcataria*, *Cananga odorata*, *Ficus* spp, *Kleinhovia hospita*, *Rhus taitensis* and *Trichospermum psilocladum*, followed by

Artocarpus altiis, *Mangifera indica*, *Cyathea brackenridgei*, *C. lunulata*, *Areca catechu*, *Caryota rumphiana*, *Pometia pinnata* and *Vitex cofassus*.

4.4 GRASSLANDS AND HEATHS

Grasslands in the Solomons account for 1-2% of the land area (Henderson and Hancock, 1988). Pendleton (1949) Whitmore (1969b) and Henderson and Hancock (1988) indicated that the largest area of grassland lies along the northern coast of Gaudalcanal where the rainshadow effect identified by Pendleton (1949) is most pronounced. Smaller areas of grassland are also found on the Nggela, Nggatokae, Malaita, Gizo, Choiseul, Savo and San

Jorge Islands. These non-forested areas appear to be fire maintained and are most likely anthropogenous in creation (Whitmore, 1969b; Henderson and Hancock, 1988). Their persistence may also be assisted by low nutrient cycling and high rates of leaching compared to the surrounding rainforests which could delay forest regeneration.

The composition of these areas is almost entirely *Themeda australis* (Pendleton, 1949; Whitmore, 1969b; Henderson and Hancock, 1988) with smaller areas of *Imperata cylindrica* (Pendleton, 1949; Whitmore, 1969b; Henderson and Hancock, 1988) and *Saccharum spontaneum* in moister areas (Whitmore, 1969b; Henderson and Hancock, 1988) while *Phragmites karka* occurs in wet locations (Pendleton, 1949; Whitmore, 1969b; Henderson and Hancock, 1988). Disturbed locations are also frequently colonized by the introduced grass *Pennisetum polystachyum* (Whitmore, 1969b). Henderson and Hancock (1988) suggest that there are only a few truly indigenous grasses and legumes, most species having been introduced.

Henderson and Hancock (1988) indicate that as a result of constant burning, the grassland becomes dominated by *Themeda australis*, often in association with *Imperata cylindrica* and the herbs; *Emilia sonchifolia*, *Mimosa invisa*, *Polygala paniculata*, *Uraria lagopodiodes* and herbaceous climbers. *Cyperus* spp, *Phragmites karka* and *Saccharum spontaneum* are found in poorly drained areas but may rarely be associated with the shrubs *Crotalaria striata*, *Morinda citrifolia* and *Premna corymbosa* which are resistant to firing. In areas which experience less severe fires, low trees less than 3 m in height can be found and may commonly include; *Casuarina equisetifolia*, *Colona scabra*, *Commersonia bartramia*, *Timonius timon* and *Trichospermum psilocladum*. In areas where soils are shallow or degraded and derived from ultrabasics, ferns such as *Chelanthus tenuifolia* and *Lindsaea ensifolia* are found in association with *Themeda australis*.

On the edges of forests, scattered stands of colonizing trees can be found, commonly *Alstonia scholaris*, *Colona scabra*, *Commersonia bartramia*, *Desmodium umbellatum*, *Hibiscus tiliaceus*, *Kleinhovia hospita*, *Macaranga aleuritoides*, *M. tanarius*, *Melastoma polyanthum*, *Morinda citrifolia*, *Premna corymbosa*, *Timonius timon*, *Trichospermum* spp, and the introduced species *Leuceana leucocephala* (Whitmore, 1969b) and *Broussonetia papyrifera*. Isolated stands of *Pandanus* sp, *Sararanga sinuosa* (Whitmore, 1969b) and *Casuarina papuana* are also found scattered through the grasslands. Interestingly, Whitmore (1969b) indicated that the dry part of Guadalcanal possesses tree species characteristic of the seasonal climates and savannah woodlands of eastern Java, the Lesser Sunda Islands and parts of Queensland and New Guinea. These species include *Garuga floribunda*, *Gyrocarpus americanus*, *Melia dubia*, *Prosopis insularis* and *Piptadenia novoguineense* (Whitmore, 1969b).

Pendleton (1949) reported two successive sequences in the grasslands of Guadalcanal which differed according to the time of the year i.e. the wet or dry season. In the dry season the barren disturbed ground was colonized by pioneers such as *Portulaca oleracea*, *Euphorbia hypericifolia*, *Amaranthus viridis* and *Stachytarpheta jamaicensis*, which were then followed by *Sida rhombifolia*, *S. spiraeifolia* and *Mimosa pudica*. During the wet season the successive sequences includes a larger number of species and is more rapid. Additional successional species under the wetter conditions include: *Physallis angulata*, *Carica papaya*, *Phragmites karka*, *Macaranga tanarius*, *Cyperus umbellatus*, *Vernania cinerea*, *ageratum conyzoides*, *Alternanthera sessilis* and *Borreria laevis* (Pendleton, 1949).

Burning of the ultrabasic forest on Santa Isabel and San Jorge has also resulted in the formation of grassland and open heath. The heath is composed of *Gleichenia* spp and *Lycopodium cernum* and is succeeded by *Commersonia bartramia* and other trees when fire is excluded (Whitmore, 1969b).

5. PLANT GEOGRAPHY

5.1 THE MELANESIAN FLORISTIC PROVINCE

The flora of the Melanesian floristic province (Bismarcks, Solomons, Santa Cruz, Vanuatu, New Caledonia, Fiji, Samoa and Tonga) contrasts with that of Malesian province (East Indian archipelago and New Guinea). The Melanesian flora is regarded as originating in Malesia but with far fewer families, genera and species (Whitmore, 1969b).

Whitmore (1969a) indicated that the separation of the floristic provinces of Malesia and Melanesia does not occur as a sharp boundary. This is shown by the number of genera which reaches their limits of distribution at what Van Steenis (1950, cited in Whitmore 1969a) termed 'demarcation knots', e.g. 575 genera reach their limit in northern Malaya, 686 genera at the Philippines/Taiwan boundary, 984 genera at the New Guinea/Queensland boundary and 287 genera at the Solomons-Bismarcks boundary (Whitmore, 1969a). Balgooy (1960, cited in Whitmore, 1969a) found that of the then known 601 genera growing in the Bismarcks and Solomons 266 or 44% of the total grew in only one archipelago, not in both. In the south, he also found that of the 572 genera growing in the Solomons or Vanuatu and Santa Cruz, 342 or 60%, grew in only one of these groups. Balgooy (1960, cited in Thorne, 1969) additionally commented that 97 phanerogamic genera reach their eastern limits in the Solomons, and 36 Pacific or southern genera reach their western limits in Vanuatu and Santa Cruz. Interestingly, Corner (1967) noted that 36 *Ficus* species terminate their eastern distribution on Makira and only nine extend to Vanuatu and beyond. The number of genera has changed since this discovery but the implications for the presence of 'demarcation knots' at either ends of the Solomons indicates that the sea barriers are effective in preventing plant dispersal making the Solomons an important botanical region.

The weaker demarcation knot indicated for the Solomons is probably due to their greater isolation relative to the larger land masses of Asia and Australia. Here larger numbers of genera are present as compared to the much smaller land masses of the Pacific. The demarcation of individual species occurs at different locations along the Solomons group and is indicative of a gradual and sometimes abrupt eastward decline in species numbers. This gradual decline has a major influence on the composition of the Solomon Islands forests compared to those of Asia or even New Guinea. Importantly it enables some species of plants and animals to take advantage of so called 'vacant niches' i.e. vacant ecological spaces left by species unable to migrate. This is of evolutionary significance as species subjected to environments or changes in competition outside their 'normal' ranges may undergo 'adaptive radiation' i.e. genetic changes enabling them to survive under different conditions, or take better advantage of an ecological situation. The land surfaces of the Solomons are relatively young, perhaps 20 million years old, immigration and adaptive radiation is still very much in an active stage. This has resulted in the Solomons possessing a lower degree of endemism or species composition than the forests of Asia but high in comparison to other South-Pacific land masses. The Solomons are significant in having the only semi-continental ecology in the South Pacific (outside New Guinea), the highest land area, plant numbers and a high variability at below species level (or high infra-specific variation) an indication of a young, actively evolving ecology. The high infra-specific variation appears as differences in flower and fruit colour, leaf fruit shape, plant size, etc from island to island.

This is of great relevance for conservation as this ecology presents an opportunity to study the evolution of island forests in their early to mid stage development, which is not often found in such isolation or unblemished condition. This type of study could have importance in the understanding of how forests function, particularly in the light of important questions related to forest management e.g. how will a forest respond to different types of logging or other human disturbance; how much of a particular product can be extracted from a forest before species are lost or the forest ceases to function as a forest; how can forest communities be renovated when excessive human damage has occurred; etc.

5.2 FLORISTIC ELEMENTS IN THE SOLOMONS - COMPOSITION, DIVERSITY AND ENDEMISM

Whitmore (1969a) described the flora as similar to the Malesia flora but containing fewer families, genera and species. Eighty-seven genera known from Fiji and/or Vanuatu and New Guinea have been identified as present in the Solomons (Whitmore, 1969a). Whitmore also assessed the known floristic composition of the Solomons in 1968 as 710 genera, 1,750 species of phanerogams and 290 species of pteridophytes. Thorne (1969) on the other hand, identified 585 genera considered indigenous to the Solomon Islands and Santa Cruz while Good (1969) assessed that there were 700 genera of which 150 were suspected of being adventives (immigrants) leaving just 550 indigenous genera. Good (1969) and Whitmore (1969a) both found the total number of species to be approximately 1,750 but with as many as 100 adventives, leaving a total of 1,650 indigenous species.

Recent work by Henderson and Hancock (1988) indicated that the species list compiled by Whitmore (1966) was biased towards the trees and shrubs and lacked a coverage of the herbaceous plants. Examination of the collections in the Honiara herbarium confirms this. An attempt was made by them to address this problem and although they added many new species they did not consider recent species' name changes (being confused over the definition of 'endemic') and did not study the large number of Solomon Islands specimens held in the herbaria in Brisbane, Kew, Leiden or Lae which would have added many other species to the list. Apart from these pitfalls the study is now regarded as the most accurate species list of the flora of the Solomons. Listings by Henderson and Hancock (1988) from specimens of the vascular flora held in the Honiara herbarium only, revealed:

- * 166 angiosperm families containing 960 genera and 2,783 species with 300-400 species regarded as immigrant;
- * 5 gymnosperm families containing 7 genera and 22 species; and
- * 34 Pteridophyte (including fern allies) families containing 110 genera and 367 species.

This increased the known number of listed taxa from:

- * 710 vascular genera (Whitmore, 1966) to 1,077 i.e. an increase of 52%;
- * 1,750 vascular species (Whitmore, 1966) to 3,172 i.e. an increase of 81%;
- * 290 Pteridophyte species (Whitmore, 1966) to 367 i.e. an increase of 27%.

The present author compared recent work by Croft (1988) on the flora of Papua New Guinea, which is the major biotic source area for the Solomons, and revealed a similar paucity in the flora as indicated earlier by Whitmore (1966, 1969a and b), Good (1969), Thorne (1969) and Schmid (1989), reflected in a severe and notable reduction in the number of families, genera and species. Analysis of this work revealed:

a 26%, 26%, 29% reduction in *Angiosperm*, *Pteridophyte* and *Gymnosperm* families respectively; and

a 63%, 64%, 67% reduction in *Angiosperm*, *Pteridophyte*, and *Gymnosperm* genera respectively from New Guinea to the Solomon Islands.

A reduction in species composition is also evident in the number of species present when compared to the estimate for New Guinea. Good (1960) calculated that over 9,000 species of angiosperms could be present in New Guinea while there could be as many as 4,500 in the Solomons. Henderson and Hancock (1988) listed 2,783, but due to the lack of botanical collection in the Solomons, especially in the mountainous regions and the incomplete nature of their herbarium search, the species number could very well be around 4,500.

Henderson and Hancock (1988) also estimated the total number of endemic species to be 89% but this is misleading as the definition included the sum of three endemic categories i.e. species endemic to the Solomons; species endemic in West and East New Guinea; and species endemic in the Solomons and Papua New Guinea but also wider areas of the tropics. Examination of the list by Henderson and Hancock (1988) reveals 1%, 72% and 16 % respectively in these groups. The 1% endemic calculation is regarded here as grossly in error even though the Solomons are regarded as having a low number of endemics (e.g. Whitmore, 1966a and b).

5.2.1 Distribution of Genera

Approximately 35% of the genera were found worldwide, 28% were Palaeotropical, 28% were Malesian of which 2% were east Malesian, and less than 2% from the Pacific (i.e. 15 genera) and minor groups did not exceed 1%. These minor groups include endemic as well as Australian genera (Whitmore, 1969a).

The Australian genera were indicated by Whitmore (1969a) to be *Acianthus*, *Casuarina*, *Commersonia* and *Hardenbergia*; the latter does not appear in the recent species listings by Henderson and Hancock (1988) nor has it been observed by the author. Noticeable Australian absentees include *Eucalyptus* and *Banksia* (Whitmore, 1969a). Additionally, both Thorne (1969) and Good (1969) commented on the absence of an Australian element in the flora and

Good (1969) added another nine Australian genera including *Acacia*, *Dianella*, *Eustrephus*, *Geitonoplesium*, *Gahnia*, *Haloragis*, *Pittosporum*, *Scaevola* and *Schoenus*.

The endemic genera include *Kajewskiella*, *Allowoodsonia* and *Homalocladium*, all of which contain only one species (Whitmore, 1969a; Good, 1969). Thorne (1969) suggests that a further three genera are endemic, namely, *Cassidispermum*, *Rehderophoenix* and *Strongylocaryum* which have one, two and three known species respectively.

Good (1969) and Thorne (1969) saw the geographical relationships of the flora in a slightly different manner to Whitmore (1969a). Good (1969) found that 43% of the genera were subcosmopolitan (panropical or palaeotropical) 38% were Indomalayan and 36% had restricted distribution. Of the latter group, 4% are found in the tropical regions of Asia and America, and the remaining 32% are either incompletely Indomalaysian i.e. occurring westwards from the Solomons or Polynesia.

Thorne (1969) found that 272 of the 585 Solomons-Santa Cruz genera identified by him were also known from New Caledonia and 379 of the 692 New Caledonian total are reported from the Solomons and Santa Cruz islands. In total, only 313 genera or 32.5% of the 964 genera found on both archipelagoes are known from both groups. This posed two important questions:

- * why does the much larger land area of the Solomons have less floral diversity than New Caledonia considering that it is closer to the New Guinea-Bismarck source area ? and
- * why is there so much difference between the floras of the two archipelagoes considering that they are linked by the Vanuatu-Santa Cruz chain of Islands?

Thorne (1969) considered that the comparative lack of diversity was due to a combination of a greater variability in the New Caledonian climate and substrate types, coupled with the greater age and isolation of the flora which has created an ecological situation conducive to the formation of new species. The Solomons on the other hand are regarded as younger and less diverse in climate and substrate, which has resulted in what Whitmore (1969a and b) referred to as a homogeneous flora. It is also known now that New Caledonia was joined to the Australian continent millions of years ago and inherited a substantial number of Gondwanic species which results in the flora being predominantly of ancient origin.

The second question is answered by the location of the Solomons which has enabled a greater representation of the Malesian migrating through New Guinea via New Britain and New Ireland. Balgooy (1960, cited in Thorne) clearly illustrated this, indicating that probably 91.4% of the Solomons genera are known to have reached the Solomons via New Guinea and the Bismarcks; 6.5% from the Pacific Islands including New Caledonia, and 1.4% from Australia, with only 0.7% of the genera being endemic.

Thorne (1969) also noted the presence of Malesian genera present in New Guinea and the Solomons which are not found in New Caledonia, namely; *Archidendron*, *Areca*, *Begonia*, *Boea*, *Brownlowia*, *Calamus*, *Camptosperma*, *Caryota*, *Costus*, *Daphniphyllum*, *Dillenia*,

Dischidia, *Dracontomelum*, *Elatostema*, *Finschia*, *Gnetum*, *Gonystylus*, *Hanguana*, *Leea*, *Licuala*, *Lophopyxis*, *Mangifera*, *Medinilla*, *Metroxylon*, *Myristica*, *Myrmecodia*, *Nauclea*, *Nypa*, *Octomeles*, *Phaleria*, *Planchonia*, *Pullea*, *Pygeum*, *Rhododendron*, *Saranga*, *Saurauia*, *Schizomeria*, *Schuermansia*, *Scirpodendron*, *Styrax*, *Vavaea* and *Xanthophyllum*.

On the other hand, many of the most representative New Guinea taxa have been unable to reach the Solomons. These include: *Araucaria*, *Coriaria*, *Dipterocarpaceae*, *Tasmannia*, *Engelhardtia*, *Eucalytus*, *Eupomatia*, *Eurya*, *Flindersia*, *Galbulimima*, *Gunnera*, *Helicia*, *Ilex*, *Impatiens*, *Magnoliaceae*, *Nepenthes*, *Nothofagus* and other *Fagaceae*, *Papuacedrus*, *Phyllocladus* and *Tecomanthe* (Thorne 1969).

Good (1969) noted that of the 550 genera of the Solomons known at that time, only nine genera, containing only a few species were not recorded from New Guinea. These genera include *Calycosia*, *Clinostigma*, *Geisois*, *Joinvillea*, *Physokentia* and *Scirpodendron* which are mainly of Pacific origin (Good, 1969). Interestingly, he also mentions that the disparity in size between the flora of the Solomons and that of New Guinea is so large that no fewer than 75 of the families and 800 of the genera of New Guinea have not been recorded from the Solomons.

As many as 350 genera found in the Solomons are found also in Australia (especially northern Queensland) and all of these are growing also in New Guinea or New Caledonia. In addition to this, as many as 55 genera or 10% are found in New Zealand

5.2.2 Distribution of Species

Thorne (1969) commented that work by Whitmore in 1969 revealed that as many as 98% of the species of Solomon Islands are also recorded in New Guinea, and as did Whitmore (1969 and b) who considered it to be an attenuated Malesian flora. Even so, Thorne (1969) considered there to be a high endemism within some genera which originated in the west. The example given was the genus *Ficus* in which Corner (1967) found 23 endemic species in the total of 63 (now known to exceed 76 species). This is in contrast to work by Henderson and Hancock (1988) since examination of their species list reveals only a 1% endemic, 16% pantropical and a 72% Papuasian element which is regarded here as misleading due to their confusion over endemism in their analysis of species distributions.

The species can also be divided into five distinct groups recognized in Melanesia which include the following:

Species associated with mangroves, seashore and beach forest and found throughout the Indo-Pacific region. These are referred to as the Indo-Pacific strand flora, examples which include *Barringtonia asiatica*, *Callophyllum inophyllum*, the mangroves (Whitmore 1966, 1969b) *Terminalia catappa*, *Casuarina equisetifolia* (Whitmore, 1966) *Ipomea pes caprae* (Whitmore, 1969a) and *Sebastiania chamaelea* (Thorne, 1969).

Species cosmopolitan to Malesia (Whitmore, 1966, 1969b) but found extending into the Solomons and sometimes into Vanuatu and Fiji (Whitmore, 1969b). Examples of these in the Solomons include *Callophyllum soulattri*, *Gonostyllus macrophyllum*

(Whitmore, 1969b) *Parinari glaberrima*, *Elaeocarpus sphaericus* and *Terminalia calamansanai* (Whitmore, 1966, 1969a).

Species of the Sahul shelf area of Malesia east of Wallace's line i.e. species from the Celebes, Moluccas and/or New Guinea (Whitmore 1966, 1969b) and occasionally Queensland (Whitmore, 1969b). Examples found in the Solomons include *Endospermum medullosum* (Whitmore, 1969b) *Gmelina moluccana*, *Prunus schlecteri*, *Schizomeria serrata* and *Camnosperma brevipetiolata* (Whitmore, 1966, 1969a).

Species of the Pacific Islands which range from Melanesia to Polynesia and occasionally into Micronesia (Whitmore 1966, 1969b). There may be widespread species such as *Fagraea berteriana* found in Melanesia, Micronesia and Polynesia (Whitmore, 1969b); or disjunct species such as *Lepinia solomonensis* found throughout the Solomons but also found on Ponape and Tahiti, or *Pandanus cominsii* found in the Solomons and Ponape (Whitmore 1966, 1969a) and the mangrove genus *Crossostylus* growing from the Solomons eastward (Whitmore, 1966).

Species centered in Melanesia which may be localized or widespread in their distribution which may occur disjunctly through Melanesia (Whitmore 1966, 1969b) and may have evolved from ancestors which migrated long ago from Malesia (Whitmore, 1966). Examples of species spreading over several archipelagos include *Buchanania attenuata* and *Canarium vanikoroense* in Santa Cruz and Fiji; *Callophyllum vitiense* and *Connarus pickeringii* in the Solomon, Santa Cruz and Fiji; *Canarium harveyi* in the Solomons, Fiji and Samoa; *Callophyllum cerasiferum* and *Pegiantha koroana* in the Solomons and Fiji; and *Terminalia brassii* in the Solomons and the Bismarcks (Whitmore 1969b). Examples of species which are locally endemic to a single archipelago include *Agathis macrophylla* from Santa Cruz and Vanuatu (Whitmore, 1966, 1969b) *Dillenia crenata*, *D. ingens*, *D. insignis* and *D. salomonensis* (Whitmore 1966, 1969b) with overlapping ranges in the Solomons (Whitmore, 1969a) *Allowoodsonia whitmorei* (Whitmore, 1969b) *Callophyllum vitiense* and *Planchonella thyrsoidea* (Whitmore, 1966). Thorne (1969) suggests that of the eight non-endemic genera which are not also reported from New Guinea, *Coronanthera* and *Geissois*, are probably of New Caledonian origin while *Carruthersia*, *Crossostylis*, *Physokentia* and *Chelonespermum* are of Pacific origin.

5.2.3 Distribution of Family

The families also fall into the five categories listed above but the proportions differ among the families, examples being as follows:

The **aroids** (*Araceae*) where all the species which occur in the Solomons are found in New Guinea and a very small number are endemic, and only one species (*Epipremnum pinnatum*) has been recorded in Fiji.

The **gingers** (*Zingiberaceae*) which have the closest affinity with New Guinea with only a few species which grow throughout Malesia and a few endemics with one

species, *Guillainia pupurata* extending into east Malesia, New Caledonia and the Caroline Islands.

The **pandans** (*Pandanaceae*) have one third to one half of their species endemic to the Solomons while the other species have a Malesian or Pacific distribution.

The **palm** family (*Arecaceae*) show the strongest endemic composition with as much as 80% of the 45 native species endemic (Moore, cited in Whitmore, 1969a) while the remainder are closely related to species in New Guinea. These genera are mostly related to those in New Guinea and Malesia (14 or 15 genera) and only three are essentially Melanesian (*Clinostigma*, *Metroxylon* and *Physokentia*). Four Malesian genera also reach their western ranges in the Solomons including *Areca*, *Caryota*, *Livistona* and *Nypa* while *Licuala* extends to Vanuatu and *Calamus* to Fiji.

The **genus** (*Heliconia*) is interesting as it is an example of a Pan-Pacific element which grows also in South America (Whitmore, 1969a, 1973). Most of the aroid genera (*Araceae*) which grow in the Solomons are also found in lowland tropical Latin America. In total, Van Steenis (1962, cited in Whitmore, 1969a) quoted 25 Solomons genera or close relatives which grow also in South America. These are listed as follows.

genera found growing in both locations which include *Homalomena*, *Schismatoglottis*, *Spathiphyllum* (*Araceae*); subfam. *Helosiodae* (*Balanophoraceae*); *Perrottettia* (*Celastraceae*); *Weinmannia* (*Cunoniaceae*); *Machaerina* (*Cyperaceae*); *Sloanea* (*Elaeocarpaceae*); *Cinnamomum*, *Endiandra*, *Litsea* (*Lauraceae*); *Ormosia* (*Fabaceae*); *Ficus* subgen. *Pharmacosycea* (*Moraceae*); *Heliconia* (*Musaceae*); *Saurauia* (*Saurauiaceae*); *Picrasma* (*Simaroubaceae*); *Symplocos* (*Symplocaceae*) and *Callicarpa* (*Verbenaceae*);

genera found in the Solomons with close relatives in South America include 3 genera of *Monstereae* (*Araceae*); *Aleurites* (*Euphorbiaceae*); *Antiaris* (*Moraceae*); *Eriandra* (*Polygalaceae*) and *Eurya* (*Theaceae*).

5.2.4 Primitive Flowering Plants in the Solomons Flora

Primitive plants possess anatomical and ecological features which are thought to indicate an evolution of the flowering plants from the more ancient cone-bearing vascular plants such as the *Araucariaceae*. These are regarded as the oldest flowering plant groups and the concentration of a number of species in one location is regarded as indicating ancient refugia where plants were able to survive the harsh changes in climate over millions of years. North Queensland is regarded as having the highest concentration of primitive angiosperms in the world, which reflects the ancient nature of the Australian land mass. The Solomons are comparatively young geologically and the land flora has not existed for hundreds of millions of years as it has in Australia.

However, the Solomons do possess some primitive groups.

Whitmore (1969a) suggests that the primitive family *Winteraceae* is of particular interest to phytogeography in Melanesia. Smith (1943, cited in Whitmore 1969a, 1973) noted that the family occurs across the Pacific with members also in South America. The family is, however, concentrated in New Guinea, the Solomons, Vanuatu, New Caledonia, and Australia, with a few in New Zealand and Fiji, and with outliers reaching as far as Borneo to the west (Whitmore 1969a). Species found in this family in the Solomons include, *Beliolium burttianum*, *B. gracile*, *B. haplopus*, *B. kajewskii* and *Tasmannia piperita* (syn. *Drimys piperita*). The latter genera is indicated by Thorne (1969) to be entirely absent from the Solomons and specimens held in the Honiara Herbarium were collected in New Guinea. Other primitive genera and species present include *Allowoodsonia whitmorei* (*Apocynaceae*); *Saranga sinuosa* (*Pandanaceae*); *Archidendron lucyi*, *A. oblongum*, *A. palauense*, *A. solomonense*, *A. sp* [14598/DCRS 536] (*Mimosaceae*); *Licuala lauterbachii*, *L. naumanii*, *L. muelleri*, *Livistona woodfordi* and *Nypa fruticans* (*Arecaceae*). This gives a total of 17 species of primitive angiosperms in five families known to Whitmore (1969a).

Thorne (1969) additionally indicated that the families *Annonaceae*, *Monimiaceae*, *Lauraceae*, *Rutaceae*, *Cunoniaceae*, *Sapotaceae*, *Proteaceae* and *Araliaceae* present in the Solomons are also regarded as primitive groups. He also made the point that the number of primitive plants is much greater in New Caledonia than in the Solomons.

Whitmore (1969a) also made special note of a primitive "life-form" group within the Solomons. The lower tree layers were found by Whitmore (1969b) to contain an abundance of the pachycaul treelets as compared to West Malesia. These are unbranched treelets of palm-like appearance commonly with crowns of large leaves (Whitmore and Burnham, 1988) which are considered a primitive group (Whitmore 1969b). Common examples are *Barringtonia papeh*, *Boerlagiodendron* spp, certain *Ficus* of sect. *Sycocarpus*, *Leea indica*, *Piper wickmanii*, *Tapeinosperma cristobalense*, *T. pachycaulum*, an undescribed *Cyrtandra*, (Whitmore, 1969b) and *Schefflera* spp. Whitmore (1969b) suggests that intensive competition from other tree species in West Malesia has meant the rarer occurrence of this group in that floral region and its more common appearance in the Solomons where there is less competition.

6. PLANT MIGRATION AND EVOLUTION OF THE FLORA

Whitmore (1969 a and b) Thorne (1969) and Good (1969) all commented on the lack of endemism in the Solomons flora. Good (1969) suggested that endemism would in the future be proved not to exceed 25%, and the Solomons would probably rank fourth in the region following New Guinea, New Caledonia and New Zealand with regard to the number of endemics present. This is in contrast to earlier work by Merrill (1945) who suggested that the geological history of the Solomons resulted in a high degree of endemism with the numbers of species within each genus limited, often with restricted occurrences.

Whitmore (1969a) noticed infra-specific variation patterns in a number of species in the Solomons, in particular *Schizomeria serrata*, *Buchanania arborescens*, *Callophyllum soulattri*, *Endospermum medullosum* and *Macaranga tanarius* (which may be classified as the species, *M. quadri-glandulosa*). Slight differences in venation, flower colour, leaf size and other features are common throughout the Solomons even though the plants may belong to the same species. Apart from the trees noted by Whitmore (1969a) other plant groups with more rapid growth such as Hoyas, Orchids and many of the herbs show physical differences within the same species found on different islands. Whitmore (1969a) suggested that this was due to the invasion of new habitats at varying times by seeds dispersed over long distances, creating patterns of variation on a regional basis and resulting in closed gene pools. It seems likely that these slight physical changes in a species are the stirrings of evolutionary adaptations to differing environmental conditions or animal interactions throughout the islands, providing that the gene pools remained isolated from further dispersal events.

The absence of many Malesian elements to form what Whitmore (1969b) termed a depauperate Malesian flora in the Solomons is also noteworthy. This is likely to be responsible for encouraging the evolutionary process by providing 'vacant niches' or 'niche opportunities'. Thus a plant or animal will take advantage of spaces in a habitat if a more competitive species is absent and may evolve through 'adaptive radiation' to take better advantage of the new conditions. Considering the geological youth of the Solomon Islands, as indicated by Falvey, et al (1991), especially its terrestrial surfaces, it would appear that the evolutionary processes of species formation are in an 'early' dynamic phase. Good (1969) also commented that the reason for the lack of speciation was due to the young age of the Solomons, geologically, especially as it was formed at a later stage in the evolution of the angiosperms.

Whitmore (1969a) suggested that the absence of families, genera and species of palaeotropical and Malesian elements is because they never reached Melanesia in the first place e.g. *Dipterocarpaceae*, or it is as a result of a long unstable geological history causing continual changes in land/sea boundaries. Whitmore's analysis of dispersal mechanisms (1969a) also showed that wind or water dispersed species are not predominant, rather there is a number of large fruited inland, and dioecious species which are unlikely to be dispersed over long distances.

The implications are important as the land masses of the world during the Quaternary Period were larger due to the lower sea levels, and land-bridges have been hypothesised as being migration routes for many species, especially large fruited species. Land bridges were known to connect large landmasses and islands including Australia and New Guinea across the Torres straight and many of the Indonesian and Philippine islands. Diamond (1983) who

studied bird distribution throughout the Solomon Islands, and Greenslade (1969) who studied the distribution patterns of insects, found a geographic segregation of the avifauna and insects into groups which are thought to be related to the migration pathways associated with landbridges in the Solomons during the Quaternary Period. Similar relations may exist for plant species.

Whitmore (1969a) also observed greater species evolution in smaller plants with short life-cycles than in the trees. This would conform with a relatively new ecology, allowing speciation to occur in short lived plants before it occurred in trees. Whitmore (1969a) also noted wide geographical as well as ecological ranges for many species. It is suggested here that the absence of many Malesian species has resulted in less competition and that 'adaptive radiation' has enabled many plants to take advantage of space, food and light opportunities.

Whitmore (1969a) was undoubtedly interested in an explanation for what he suggested was a lack of endemism in the Solomons flora, noting its value for evolutionary studies. In considering this statement, one must also consider the unresearched nature of the Solomons forests. Collections of the Solomons flora by Whitmore and others, were mostly of tree specimens, and many of the smaller herbs, vines, parasites and epiphytes are poorly represented in the collections. At the Honiara Herbarium most of the approximately 30,000 specimens are trees and shrubs. Therefore, it is likely that a greater number of endemic species will emerge as further collections are made. Whitmore also suggested that flowering plant evolution has been very slow in the Solomon Islands, but it is suggested here that this observation is due to the youth of the ecology and in fact the opposite is probably the case.

7. PROJECT FINDINGS

7.1 METHODOLOGY

The methodology used for this analysis is outlined in Schenk (1992) and SOLFRIP (1992) and will not be repeated here. Adaptions to the methods are, however, noted below.

In the analysis of the tree floristics, an eight group cluster was selected as this would show relationships among the eight regional units (or main island groups). The analysis was also segregated into the three classes i.e. trees greater than 60 cm in diameter, trees between 30 and 60 cm in diameter and trees between 10 and 30 cm in diameter, to give floristic grouping for each age class. The age/size classes were not combined due to the different plot sizes used for each of these classes.

In the analysis of structure, only seven groups were selected to show relationships among the regional groups as structural data for Rennell had not been entered into the database at the time of the analysis.

7.2 FLORISTICS

Solomon Islands tree species which exceed a diameter of ten cm, and recorded by the inventory, are listed in Appendix One, Table Four. This list was generated from a database containing 13,674 records, 3,654 plot locations and 214 species. They are presented from the most common to the least common tree species and provide an indication of the abundance of the tree species throughout the island group. Note the importance of *Pometia pinnata* and the rapid decline in abundance of other species in this list.

Appendix One, Table Five (a) also shows the number of sampled plots, distinct species identified, and the total number of records for each province. Additional calculations of the average tree diversity and density for each province have also been provided as an index.

Appendix One, Table Five (b) is basically the same as Table Five (a) but for trees above sixty centimetres in diameter only. This makes an adjustment for the variability in tree size data collected on Guadalcanal, Malaita and Rennell (i.e. lack of standardisation of tree and plot size) so that tree diversity and density can be compared without bias.

Appendix One, Table Six, lists the tree species in alphabetical order but divides the trees into five age/size classes to show canopy and understorey relationships. These age classes are:

- * trees exceeding 60 cm in diameter;
- * trees between 30 and 60 cm in diameter;
- * trees between 10 and 30 cm in diameter;
- * trees not exceeding 60 cm in diameter;

* trees found to be less than 30 cm in diameter, excluding species which may exceed this diameter in the future i.e. they are found exclusively as mature trees less than 30 cm in diameter. The most outstanding aspect of this table is that very few understorey tree-lets (22 species) were identified from the total of two hundred and fourteen species.

Appendix One, Table Seven, lists the occurrence of tree species sampled for each province and provides a guide to biogeographic distributions and abundance. Caution should be used in the interpretation of this list as it does not include biogeographic information from other sources such as the Honiara Herbarium which would certainly extend the range of many of the species.

Table Eight and Table Nine of Appendix One compare two tree age/size classes i.e. trees with a girth exceeding two metres (diameter 64 cm) and trees with a girth exceeding four metres (diameter 127 cm) respectively. These are compared with species lists compiled by Walker (1948) and Whitmore (1966, 1969b). Table Eight lists 113 species identified by the inventory which exceed two metres in girth. Walker (1948) listed 16 species exceeding two metres in girth, of which 14 were identified by the inventory, while Whitmore (1966, 1969b) identified well over 100 species of which only 52 were found by the inventory to exceed two metres in girth. Table Nine also lists 23 species which were found by the inventory to exceed four metres in girth. Whitmore (1966, 1969b) identified 12 species which exceeded four metres in girth, of which six were also recorded by the inventory.

7.2.1 Trees Exceeding 60 Centimetres in Diameter

Figures Five (1-8) illustrate the distribution of eight tree associations throughout the islands with a diameter exceeding sixty centimetres. These would be trees found in the upper canopy and as emergents or individuals in the forest.

The association has been grouped according to membership provided by the cluster analysis and they are displayed in their order of association from the most closely associated to the least strongly associated (i.e. labelled from 1 to 8 respectively).

1. *Pometia* associated forest

Figure Five (1) includes lowland forests where the largest trees are mainly *Pometia pinnata* with or without co-associates such as *Terminalia brassii*, *Albizia falcataria*, *Amoora cucullata*, *Neonauclea* sp, *Schizomeria brassii*, *Trichospermum fauroensis*, *Sterculia conwentzii*, *Dysoxylum guadichaudianum*, *Callophyllum kajewskii*, *Terminalia calamansanai*, *T. brassii*, *T. aff. rubiginosa*, *Camptosperma brevipetiolata*, *Canarium indicum*, *Gmelina moloccana*, *Dillenia ingens*, *Eugenia buettneriana*, *Heritiera solomonensis*, *Endospermum medullosum*, *Trema orientalis*, *Maranthes corymbosa*, *Celtis latifolia*, and *Pterocarpus indicus*.

The distribution is wide with the notable exclusion of Rennell and Bellona Islands.

2. *Vitex/Pometia* associated forest

Figure Five (2) illustrates the distribution of forests where the largest trees form a *Vitex cofassus/Pometia pinnata* association. Very rarely, these may contain co-associates such as *Ficus polyantha* and *Parinari salomonensis*, and often occur together as the only dominant large trees in the stand.

The distribution is confined to the northern island groups i.e. excluding Makira, Santa Cruz and Rennell/Bellona.

3. Mixed species forest containing no associated dominants

Figure Five (3) shows mixed species forests containing no clear associated dominants. Important species recorded by the inventory as the largest trees include: *Dillenia ingens*, *Alstonia scholaris*, *A. spectabilis*, *Vitex cofassus*, *Polyscias neo-edudanum*, *Terminalia calamansanai*, *T. brassii*, *T. aff. rubiginosa*, *Ficus obliqua*, *Cetis latifolia*, *Canarium salomonense*, *Schizomeria brassii*, *Parinari salomonensis*, *Pterocarpus indicus*, *Neonauclea* sp, *Palaquium* sp, *Intsia bijuga*, *Parinari glaberrima*, *Aglaia brassii*, *Macaranga* sp, *Archidendron oblongum*, *Abizia falcataria*, *Kingiodendron alternifolium*, *Maranthes corybosa*, *Planchonella obovata*, *Gmelina moluccana*, *Campnosperma brevipetiolata*, *Calophyllum vitiense*, *Sterculia parkinsonii*, *Elaeocarpus salomonensis*, *Callophyllum kajewskii*, *Burckella obovata*, *Euodia bonwickii*, *Amoora cucullata*, *Artocarpus altilis*, *Dysoxylum gaudichaudianum*.

The association is widely distributed and all island groups are included.

4. *Pterocarpus indicus* associated forest

Figure Five (4) includes lowland forests where the largest trees are mainly *Pterocarpus indicus* with associates such as *Pometia pinnata*, *Callophyllum vitiense*, *Ficus obliqua*, *F. polyantha*, *Neonuclea aff. brassii*, *Neonauclea* sp, *Vitex cofassus*, *Securinega* sp, *Alstonia scholaris*, *Canarium salomonense*, *Dysoxylum excelsum*, *Eugenia buettneriana*, *Terminalia aff. rubiginosa*.

This association is confined to the southern island groups of Malaita, Guadalcanal, Makira and Santa Cruz, i.e. it excludes Choiseul, Isabel, New Georgia and Rennell/Bellona.

5. *Dillenia salomonensis* associated forest

Figure Five (5) illustrates the distribution of lowland forest where the largest trees form a *Dillenia salomonensis* association with co-associates such as *Aglaia sapindina*, *Gonostylus macrophyllus*, *Callophyllum vitiense*, *Alstonia scholaris*, *Pometia pinnata*, *Ailanthus* sp, *Heritiera solomonensis*, *Teysmanniodendron* sp, *Terminalia solomonensis*, *Kingiodendron alternifolium*.

This association is of a northerly distribution and excludes Guadalcanal, Makira, Santa Cruz and Rennell/Bellona.

6. *Palaquium* spp associated forest

Figure Five (6) shows a disjunct distribution of lowland forest where the largest trees form a *Palaquium* spp association with co-associates which include *Callophyllum kajewskii*, *Ziziphus angustifolius*, *Endospermum moluccanum*, *Nauclea orientalis*, *Elaeocarpus polyandrus*, *Canarium vitiense*, *Terminalia* aff. *rubiginosa*, *Dysoxylum gaudichaudianum*, *Sterculia conwentzii*.

The distribution is disjunct and is located in the northern and southern islands excluding Isabel, New Georgia, Guadalcanal and Makira.

7. *Endospermum* dominated forest

Figure Five (7) indicates the location of lowland forest where the largest trees are *Endospermum moluccanum* and possibly *E. medullosum* only, with no other co-associates.

This is an isolated southern distribution including Guadalcanal and Rennell/Bellona and excludes Choiseul, Isabel, New Georgia, Malaita, Makira, and Santa Cruz.

8. *Campnosperma brevipetiolata* associated forest

Figure Five (8) shows lowland forest where the largest trees are in a *Campnosperma brevipetiolata* association with or without co-dominants such as *Dillinia indica*, *D. salomonensis*, *Callophyllum vitiense*, *Campnosperma brevipetiolata*, *Myristica kajewskii*, *Elaeocarpus sphaericus*, *Amoora cucullata*, *Pterocarpus indicus*, *Dysoxylum excelsum*, *Terminalia brassii*, *T. aff. rubiginosa*, *Maranthes corymbosa*, *Gmelina moluccana*, *Linociera macrophylla*, *Amoora cucullata*, *Myristica* sp, *Pometia pinnata*, *Burckella obovata*, *Inocarpus fagiferus*, *Pterocarpus indicus*, *Dysoxylum excelsum*. On the islands of Santa Cruz this association includes the large emergent *Araucarian*, *Agathis macrophylla*.

This is a fairly wide distribution and excludes Malaita, Makira, Guadalcanal and Rennell/Bellona.

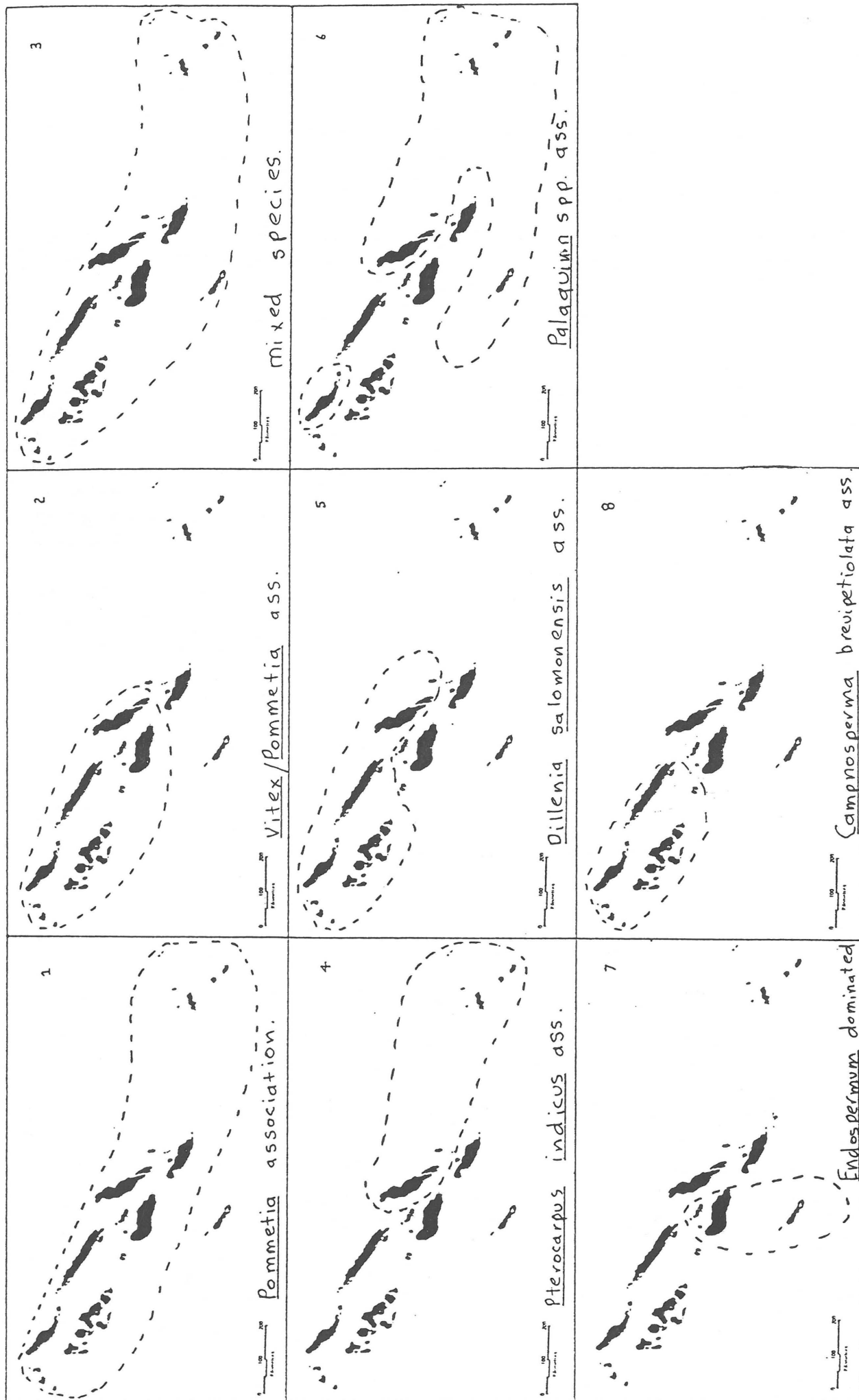


Figure 5. Distribution of the eight major tree associations of the Solomon Islands for trees greater than sixty centimeters.

7.2.2 Trees 30 to 60 Centimetres in Diameter

Figures Six (1-8) illustrate the distribution of eight associations throughout the islands of trees with a diameter of between 30 and 60 centimetres. These trees would be found in the upper to mid canopy of the forest.

The associations have been grouped according to the membership listing provided by the cluster analyses and are displayed in their order of association from the most closely associated to the least strongly associated i.e. labelled from 1 to 8 respectively.

1. Mixed species forest

Figure Six (1) shows the distribution of mixed species forest containing no particular dominants in the upper to mid-height canopy. Trees identified in this association include *Vitex cofassus*, *Canarium vitiense*, *C. salomonense*, *C. indicum*, *Myristica kajewskii*, *M. insularis*, *Gomphandra montana*, *Schefflera* sp, *Teysmanniodendron* sp, *Dysoxylum arborescens*, *D. excelsum*, *Decaspermum fruticosum*, *Trichospermum fauroensis*, *Trichospermum arachnoideum*, *Alhertia incana*, *Alangium javanicum*, *Macaranga* sp, *Neonauclea* sp, *Ziziphus angustifolius*, *Eugenia buettneriana*, *E. effusa*, *Parinari glaberrima*, *Medusabuthera papuana*, *Bischofia javanica*, *Camposperma brevipetiolata*, *Agathis macrophylla*, *Bridelia minutiflora*, *Syzygium* spp, *Semecarpus australis*, *Diospyros salomonensis*, *Prunus schlechteri*, *Caphyllum cerasiferum*, *Aporosa papuana*, *Aglaia leporrhachis*, *Trema orientalis*, *Terminalia calamansanai*, *Pometia pinnata*, *Intsia bijuga*, *Litsea flavinervis*, *Pagiantha koroana*, *Alstonia spectabilis*, *Garcinia scaphopetala*, *Dillinia ingens*, *Steckia conwentzii*, *Endospermum moluccanum*, *Calophyllum kajewskii*, and others.

The distribution of this forest type is wide and is present in every major island group.

2. *Eugenia buettneriana* association

Figure Six (2) locates the distribution of forests where *Eugenia buettneriana* is an important species in the upper to mid-height canopy. Associates may include *Cetis latifolia*, *Amoora cucullata*, *Hernandia papuana*, *Maranthes corymbosa*, *Schizomeria brassii*, *Garcinia celebica*, *Pometia pinnata*, *Pimeleodendron amboinicum*, *Myristica kajewskii*, *Stemonurus umbellatus*, *Pimeleodendron amboinicum*, *Pagiantha koroana*, *Neoscortechinia forbesii*, *Parinari salomonensis*, *Gonystylus macrophyllus*, *Amoora cucullata*, *Agathis macrophylla*, *Pometia pinnata*, *Elaeocarpus floridanus*, *E. sphaericus*, *Neoscortechinia forbesii*, *Medusanthura papuana*, *Stemonurus umbellatus*, *Semecarpus australis*, *Eugenia aquem*, *Prunus schlechteri*, *Aporosa papuana*, *Medusanthura papuana* and *Polyscias scutellaria*.

This association is widely distributed but is not found on the island of Isabel.

3. Miscellaneous species

Figure Six (3) shows the distribution of species which could not be identified by the SOLFRIP field teams. As such, the classification is not a valid association. The cluster analysis ranked the group as third in importance due to the commonality of the unidentified species throughout the islands.

4. *Campnosperma brevipetiolata* dominated forest

Figure Six (4) depicts the distribution of forests where the dominant trees in the upper to middle layers of the forest are *Campnosperma brevipetiolata*. These occur primarily as pure stands. No co-associates were identified.

The distribution is disjunct with associations occurring in the north and south with a notable absence from Guadalcanal, Malaita, Makira and Rennell/Bellona islands.

5. *Neoscortechinia forbesii* associated forest

Figure Six (5) shows the distribution of forests in a *Neoscortechinia forbesii* association in the upper to middle layers of the canopy. Common associates may include *Campnosperma brevipetiolata*, *Inocarpus fagiferus*, *Planchonella thyrsoides*, *Planchonella firma*, *Elaeocarpus polyandrus*, *Dysoxylum guadichaudianum*, *Alphitonia incana*, *Gironniera celtidifolia*, *Gomphandra montana*, *Schizomeria brassii*, *Garcinia scaphopetala*, *Teysmanniodendron* spp, *Pongamia pinnata*, *Ficus polyantha*, *Eugenia buettneriana*, *Dillinia ingens* and *Trichospermum peekelii*.

The distribution for this association is northern and excludes the outlying island groups of Santa Cruz and Rennell/Bellona.

6. *Pometia pinnata* associated forest

Figure Six (6) depicts the distribution of the *Pometia pinnata* associated forest, throughout the island group and found in the upper to middle layers of the forest. These may occur as almost pure stands of *Pometia* or may be associated with species such as *Ficus obliqua*, *Myristica kajewskii*, *Pimelioidendron ambionicum*, *Serianthes edudanum*, *Teysmanniodendron* spp, *Casearia grewiaefolia*, *Terminalia complanata*, *Endospermum moluccanum*, *Neoscortechinia forbesii*, *Callophyllum kajewskii*, *Ficus nodosa*, *Canarium salomonense*, *Gmelina moluccana*, *Sterculia parkinsonii*, *Amoora cucullata*, *Goniothalamus* spp, *Kleinhovia hospita*, *Neuburgia corynocarpa*, *Canarium indicum*, *Burckella obovata*, *Neoscortechinia forbesii*, *Dillinia ingens*, *Sterculia conwentzii*, *Bchanania arborescens*, *Albizia falcata*, *Terminalia* aff. *rubiginosa* and *Amoora cucullata*.

This association is widely distributed but with the exception of Rennell and Bellona islands.

7. *Palaquium* spp/*Sterculia parkinsonii* associated forest

Figure Six (7) shows the distribution of *Palaquium* spp/*Sterculia parkinsonii* associated forest throughout the islands in the upper to middle layers of the forest. Co-associates may include: *Celtis latifolia*, *C. nymanii*, *Elaeocarpus floridanus*, *Dillenia salomonensis*, *Aglaia lepiorrhachis*, *Semacarpus australis*, *Aglaia brassii*, *Terminalia* aff. *rubiginosa*, *Diospyros salomensis*, *Fic* spp, *Syzygium aquem*, *Dillenia ingens*, *Aglaia lepiorrhachis*, *Terminalia calamansanai*, *Litsea flavinervis*, *Elaeocarps sphaericus*, *Sloanea insularis* and *Burckella obovata*.

The distribution is wide, covering all of the island groups.

8. *Palaquium* dominated forest

Figure Six (8) shows the distribution of *Palaquium* spp dominated forest in the upper to middle layers of the forest. In this association, *Palaquium* may occur as pure localised stands or may be found interspersed with larger stands of *Palaquium* spp/*Sterculia parkinsonia* forest.

The distribution is wide, occurring on all the major island groups except the Santa Cruz group.

7.2.3 Trees 10 to 30 Centimeters in Diameter

Figures Seven (1-8) illustrate the distribution of eight tree associations throughout the islands with a diameter between 10 and 30 centimetres. These trees would be found in the lower to mid-height canopy of the forest.

The associations have been grouped according to the membership listing provided by the cluster analyses and members are displayed in their order of association from the most closely associated to the least strongly associated i.e. labelled from one to eight respectively. Trees in this size class were not sampled in the early stages of the inventory, i.e. in Guadalcanal and Malaita.

1. *Alangium javanicum* associated forest

Figure Seven (1) depicts the distribution of *Alangium javanicum* associated forest in the mid to lower layers of the forest canopy. As small trees were not sampled on Guadalcanal and Malaita, disjuncture has been impossible to access and dotted lines have been used to indicate possible connections with Guadalcanal and Malaita.

Trees of the same age class associated with this forest may include: *Eugenia* sp, *Ficus nodosa*, *Camptosperma brevipetiolata*, *Dysoxylum gaudichaudianum*, *Pometia pinnata*, *Neuburgia corynocarpa*, *Canarium indicum*, *Celtis floribunda*, *C. latifolia*, *Prunus schlechteri*, *Semecarpus australis*, *Artocarpus communis*, *Horsfieldia solomonensis*, *Syzygium aqueum*, *Sterculia conwentzii*, *Cryptocarya medicinalis*, *Gomphandra montana*, *Dysoxylum excelsum*, *Myristica insularis*, *Boerlagiodendron pachycephalum*, *Litsea timoriana*, *Breynia racemosa*, *Aglaia brassii*, *Terminalia calamansanai*, *Neoscortechinia forbesii*, *Symplocos cochinchinensis*, and *Stemonurus umbellatus*.

The distribution is wide, with the exception of Rennell/ Bellona.

2. *Camptosperma brevipetiolata* associated forest

Figure Seven (2) illustrates the distribution of *Camptosperma brevipetiolata* forest in the mid to lower layers of the forest canopy. Small trees were not sampled on Guadalcanal and Malaita, so dotted lines have been used to indicate possible connections in distribution over Guadalcanal and Malaita. It has not been possible to assess disjuncture.

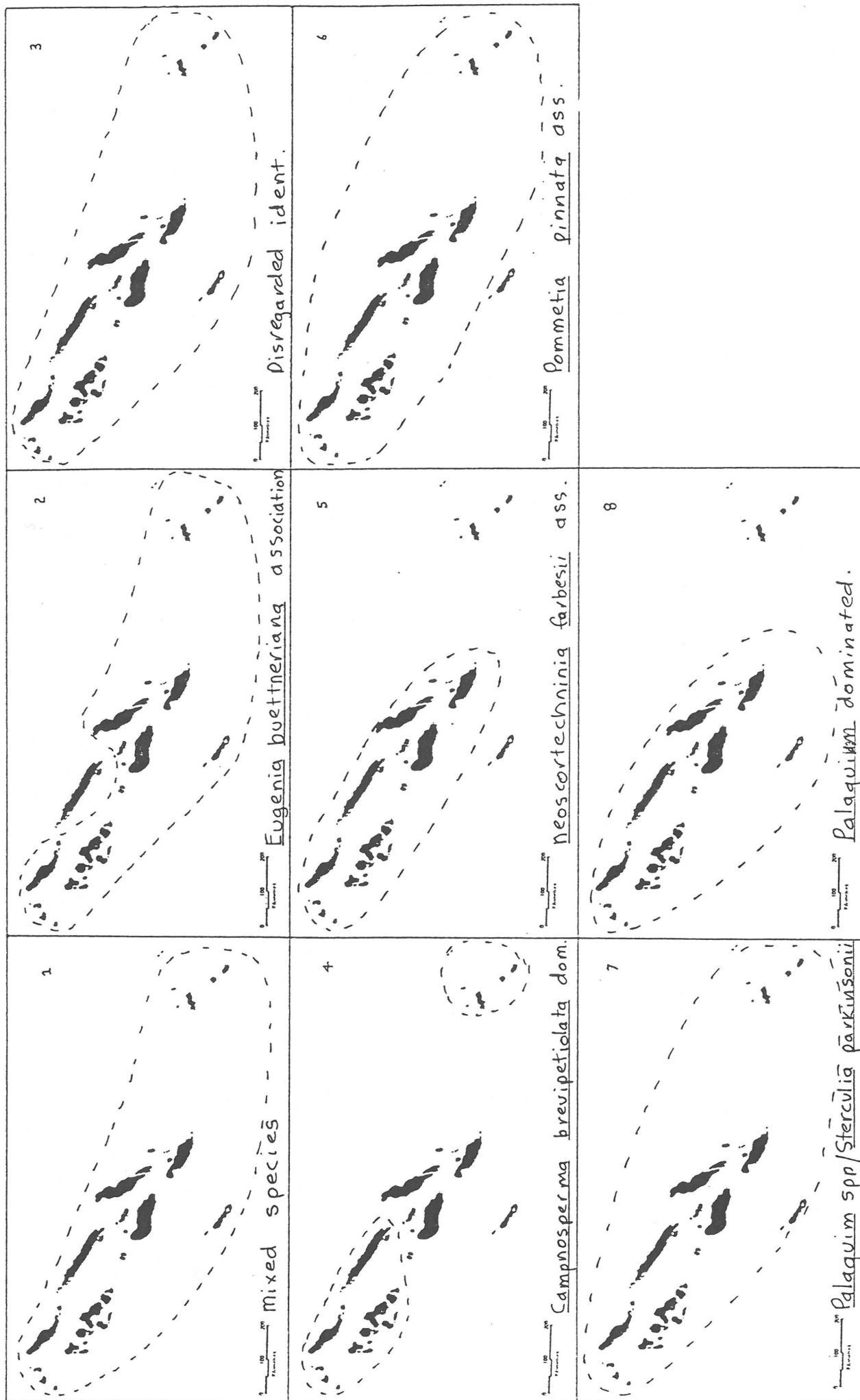


Figure 6. Distribution of the eight major tree associations of the Solomon Islands for trees between thirty and sixty centimeters.

This type may occur as small stands, solely composed of *Camptosperma* or may be associated with *Euodia bonwickii*, *Myristica kajewskii*, *Macaranga* spp, *Eugenia* spp, *Ficus nodosa*, *Alangium javanica*, *Dysoxylum gaudichaudianum*, *Polyscias neo-ebudanum*, *Decaspermum fruticosum*, *Garcinia scaphopetala*, and others.

The distribution is wide, with the exception of Rennell/ Bellona.

3. Mixed species forest

Figure Seven (3) shows the distribution of mixed species forest in the mid to lower layers of the forest which may or may not have *Pometia pinnata*, *Elaeocarpus floridanus*, *Alangium javanicum* and *Aporosa papuana* as common species. Small trees were not sampled on Guadalcanal and Malaita. Dotted lines have been used to indicate possible connections in distribution over Guadalcanal and Malaita. It has not been possible to assess disjuncture.

Other associates may include *Terminalia brassii*, *Dysoxylum excelsum*, *Dysoxylum gaudichaudianum*, *Aglaia lepiorrhachis*, *Gomphandra montana*, *Buchanania arborescens*, *Aglaia sapindina*, *Neoscortechinia forbesii*, *Terminalia* aff. *rubiginosa*, *Sterculia parkinsonii*, *Timonius timon*, *Eugenia buettneriana*, *Finschia waterhousiana*, *Bischofia javanica*, *Macaranga* sp, *Endospermum moluccanum*, *Elaeocarpus floridanus*, *Dillinia salomonensis* and others.

The distribution is wide, and no island groups are excluded.

4. *Asthronidium alatum* associated forest

Figure Seven (4) depicts the distribution of *Asthronidium alatum* associated forest in the mid to lower layers of the forest. Small trees were not sampled on Guadalcanal and Malaita so dotted lines have been used to indicate possible connections in distribution over Guadalcanal and Malaita. It was not possible to assess disjuncture.

Associated species may include *Timonius* spp, *Colona* spp, *Syzygium aquem*, *Euodia bonwickii*, *Pongamia pinnata*, *Eugenia buettneriana*, *Garcinia scaphopetala*, *Albizia falcataria*, *Teysmanniodendron* spp, *Xylopia peekelii* and *Neoscortechinia forbesii*.

The distribution is quite wide, with the exclusion of Choiseul in the north and Rennell and Bellona, Makira and Santa Cruz in the South.

5. *Semecarpus australis* associated forest

Figure Seven (5) depicts the distribution of *Semecarpus australis* associated forest in the mid to lower layers of the forest. Dotted lines have been used to indicate possible connections in distribution over Guadalcanal and Malaita. It has not been possible to assess disjuncture.

Associated species may include *Neoscortechinia forbesii*, *Symplocos cochinchinensis*, *Kingiodendron alternifolium*, *Boerlagiodendron pachycephalum*, *Terminalia calamansanai*, *Myristica kajewskii*, *Pterocarpus indicus*, *Eugenia buettneriana*, *Endiandra solomonensis*, *Pometia pinnata*, *Burckella obovata*, *Sterculia conwentzii*, *Canarium salomonense*, *Celtis*

philippensis, *Elaeocarpus salomonensis*, *E. floridanus*, *Myristica kajewskii*, *Diospyros salomonensis*, *Terminalia aff. rubiginosa*, *Planchonella* sp, *Ficus* spp, *Glochidion angulatum* and others.

The distribution is wide and no island groups are excluded.

6. *Neoscortechinia forbesii* associated forest

Figure Seven (6) shows the distribution of *Neoscortechinia forbesii* associated forest in the mid to lower layers of the forest. Dotted lines have been used to indicate possible connections in distribution over Guadalcanal and Malaita. It has not been possible to assess disjuncture.

Associated species may include *Neonauclea aff. brassii*, *Aporosa papuana*, *Dillenia ingens*, *Parinari glaberrima*, *Timonius* spp, *Camptosperma brevipetiolata*, *Eugenia* spp, *Callophyllum cerasiferum*, *C. vitiense*, *Toona sureni*, *MeduSantahera papuana*, *Stemonurus umbellatus*, *Pometia pinnata*, *Pimeleodendron amboinicum*, *Merrilliodendron megacarpum*, *Aglaia brassii*, *Asthrnidium alatum*, *Dysoxylum pettigrewianum*, *Elaeocarpus sphaericus*, *Parinari glaberrima*, *Steculia conwentzii*, *Aporosa papuana*, *Cryptocarya alleniana*, *Alangium javanicum*, *Stemonurus umbellatus*, *Psychotria beccari*, *Macaranga* sp, *Paiantha koroana*, *Randia coffeoides*, *Amoora cucullata*, *Endospermum moluccanum*, *Myristica kajewskii*, *Ficus* spp, *Dysoxylum excelsum* and others.

The distribution is wide and no island groups are excluded.

7. *Aglaia sapindina* associated forest

Figure Seven (7) shows the distribution of *Aglaia sapindina* associated forest in the mid to lower layers of the forest canopy. Dotted lines have been used to indicate possible connections in distribution over Guadalcanal and Malaita. It has not been possible to assess disjuncture.

Associated species may include *Sterculia conwentzii*, *S. pakinsonia*, *Nauclea orientalis*, *Terminalia calamansanai*, *Finschia waterhousiana*, *Crossostylis cominsii*, *Diospyros salomonensis*, *Palaquium* spp, *Bischofia javanica*, *Celtis latifolia*, *Eugenia* spp, *Ficus* spp, *Timonius* spp, *Pometia pinnata*, *Neoscortechinia forbesii*, *MeduSantahera papuana*, *Pterocarpus indicus*, *Terminalia aff. rubiginosa*, *Macaranga* spp, *Alangium javanicum*, *Schefflera* spp and others.

The distribution is wide and no island groups are excluded.

8. *Teysmanniodendron* spp associated forest

Figure Seven (8) shows the distribution of the *Teysmanniodendron* spp associated forest in the mid to lower canopy layers of the forest. Dotted lines have been used to indicate possible connections in distribution over Guadalcanal and Malaita. It has not been possible to assess disjuncture.

Species associated with this forest may include *Camptosperma brevipetiolata*, *Aglaia sapindina*, *A. lepiorrhachis*, *Asthrnidium alatum*, *Ardisia brackenridgei*, *Aporosa papuana*,

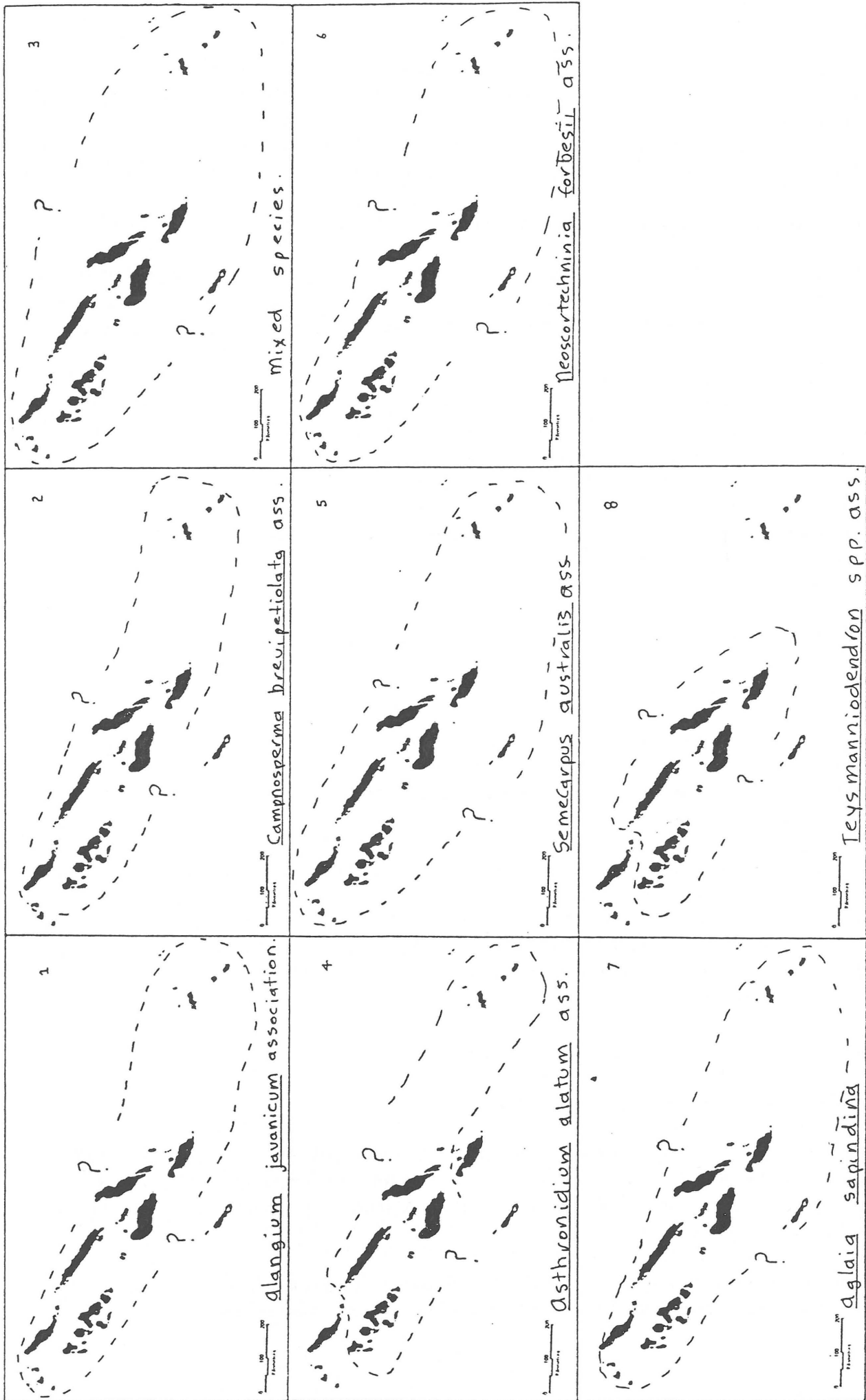


Figure 7. Distribution of the eight major tree associations of the Solomon Islands for trees between ten and thirty centimeters.

Tmonius sp, *Gonystylus macrophyllus*, *Callophyllum vitiense*, *C. kajewskii*, *Neoscortechinia forbesii*, *Crossostylis cominsii*, *Parinari salomonensis*, *MeduSantahera papuana*, *Gomphandra montana*, *Macaranga* spp, *Parinari glaberrima*, *Xylopia peekelii*, *Canarium vitiense*, *Fagraea raemosa*, and others

The distribution is central, with the exclusion of Choiseul in the north and Rennell and Bellona, and Santa Cruz in the South.

7.3 FOREST STRUCTURE

Table Ten displays the forest types which occur in each cluster group, and the three associated groupings related to disturbance. These were assessed from the structural cluster analyses with groupings varying according to environmental and physical features and related to the varying types of disturbance.

TABLE TEN
FOREST TYPES WHICH OCCUR IN EACH CLUSTER GROUP
AND THEIR RELATIONSHIP TO DISTURBANCE

	Cluster Groups						
	1	2	3	4	5	6	7
Lowland Primary Rainforest	*	*	*	*	*	*	
Lowland Primary R'forest on ridges	*	*	*	*	*	*	
Woodland	*						
Swamp forest	*	*	*				
Riverine forest	*	*	*				
Secondary forest	*	*	*				
Mangrove						*	*
	<--	A	-->	<--	B	-->	C

KEY:

A: continuously disturbed lowland forests (e.g. constant waterlogging, fire, heavy metal concentrations, etc) or forest showing little sign of ephemeral disturbances (e.g. cyclones, tree-falls, flooding, temporary drainage impediment, etc). The result is the so-called Clementsian climax or disclimax state.

B: lowland forest where disturbances are ephemeral in nature (due e.g. to cyclones, tree-falls, flooding, temporary drainage impediment, etc), resulting in the establishment of a succession (i.e. changes in structure and floristics which then lead to the so-called climax state.)

C: mangrove forest constantly subject to salinity changes, anaerobic conditions, acidic soils and varying water depth.

7.3.1 Descriptions of the Broad Structural Groupings

THE LOWLAND FOREST

Trees

The general primary features of the tree layer include:

- * tall palms with single stems and feather or fan leaves;
- * stranglers;
- * bamboo;
- * stilt, straight, plank, club, flying and spreading tree buttresses;
- * uneven stem or trunk sizes;
- * presence of dead standing trees;
- * commonly two to many canopy layers;
- * a high canopy height;
- * a range of gap sizes but with medium (50-75% plot exposed to sky) to large gaps (>75% plot exposed to sky) predominating.

Secondary features in the tree layer may or may not include:

- * banyans;
- * cycads;
- * tree-ferns;
- * palm-like trees such as *Pandanus*;
- * *Casuarina*
- * peg, stilt and knee roots in ecotonal lowland/mangrove forest.

The Shrub Layer

The general primary features of the shrub layer include:

- * single stemmed palms with feather or fan leaves;
- * palm-like shrubs such as *Cordyline* sp;
- * tree-ferns or large ferns;
- * dicotyledonous shrubs.

The secondary features of the shrub layer may or may not include:

- * bamboo;
- * cycads.

The Vine Layer

The primary features of the vine layer include:

- * large thick stemmed vines;
- * creeping vines;
- * thin stemmed climbing vines;
- * scrambling vines;
- * rattans of large, medium and small size.

The Herb Layer

The primary features of the herb layer include:

- * small leaved herbs;
- * large leaved herbs such as *Musa* spp and *Heliconia* spp;
- * sedge like grasses;
- * ferns;
- * strap leaved herbs such as *Dianella* spp;
- * ground lichens;
- * ground mosses;
- * tree seedlings.

Secondary features of the herb layer may or may not include:

- * tussock, rush and sod-forming grasses.

The Epiphyte Layer

The primary features of the epiphyte layer include:

- * trunk and crown orchids;
- * trunk and crown ant plants;
- * trunk and crown lichens;
- * trunk and crown ferns;
- * trunk and crown climbing epiphytes;
- * trunk and crown mosses and liverworts;
- * leaf liverworts and lichens (epiphylls).

The Soils

Lowland rainforests occur on a wide variety of soil types, soil textures and pH and no structural grouping was noted for any or these variables. They include black, brown, grey, red and brown soils, their textures may include loams, clay, peat and sand; pH may range from 3.5 to 9.

STRUCTURAL DIFFERENTIATION BETWEEN THE LOWLAND CLIMAX/ DISCLIMAX AND SUCCESSIONAL FORESTS

Distinctive structural features of the climax/disclimax and successional forests which distinguish these forests from each other include the following.

A tree layer containing:

- * tall palms with single stems and feather leaves in greater numbers in the successional forest;
- * tall palms with single stems and fan leaves in greater numbers in the successional forests;
- * tree-ferns in greater numbers in the successional forests;
- * *Casuarina* sometimes present in the disclimax forests;
- * tree sized Cycads sometimes present in the climax/disclimax forest;
- * bamboo sometimes in greater numbers in the climax/disclimax forest;
- * dead standing trees in greater numbers in the successional forests;
- * club buttresses in greater numbers in the successional forests (associated with larger numbers of palms);
- * trees larger than 30 cm, sometimes less in climax/disclimax forests (possibly with an age/cyclone relationship);
- * canopy gaps sometimes larger in the successional forests;
- * tree layers sometimes less in the climax/disclimax forests.

A shrub layer containing:

- * small palms with single stems and feather leaves in greater numbers in the successional forests;
- * small palms with single stems and fan leaves in greater

numbers in the successional forests;

- * palm-like shrubs (e.g. *Cordyline* spp) in greater numbers in the climax/disclimax forests;

- * tree-ferns in greater numbers in the successional forests.

A vine layer containing:

- * large rattans in greater numbers in the successional forests;

- * medium size rattans in larger numbers in the successional forests;

- * small rattans in larger numbers in the successional forests;

- * large thick stemmed vines sometimes in greater numbers in the successional forests;

- * scramblers sometimes in greater numbers in the successional forests.

A herb layer containing:

- * large leaved herbs sometimes in greater numbers in the climax/disclimax forests;

- * hummock grasses sometimes present in the successional forests and absent from the climax/disclimax forests;

- * sedge like grasses sometimes in greater numbers in the successional forests.

An epiphyte layer containing:

- * epiphytic orchids on the trunk sometimes in greater numbers in the successional forest;

- * ant plants (myrmecophytes) on the trunk sometimes in greater numbers in the successional forests;

- * epiphytic ferns on the trunk sometimes in greater numbers in the successional forests.

THE MANGROVE FORESTS

The Tree Layer

The primary structural features of the tree layer include:

- * palm like trees such as *Pandanus* spp;
- * dicotyledonous trees other than mangroves;
- * stilt, peg and knee roots.

The Shrub Layer

The primary features of the shrub layer include:

- * dicotyledonous shrubs other than mangroves;
- * large-ferns;
- * palm-like shrubs such as *Pandanus* spp;
- * single stem palms with fan leaves.

The Vine Layer

The primary features of the vine layer include:

- * creeping vines;
- * thin stemmed climbing vines.

The Herb Layer

The primary features of the herb layer include:

- * small leaved herbs;
- * large leaved herbs;
- * sedge and rush like grasses;
- * strap leaved herbs;
- * ground lichens;
- * ground mosses;
- * tree seedlings.

The Epiphyte Layer

The primary features of the epiphyte layer include:

- * trunk and crown orchids;
- * trunk and crown ant plants;
- * trunk and crown lichens;
- * trunk and crown ferns;
- * trunk and crown climbing epiphytes;
- * trunk and crown mosses and liverworts;
- * leaf liverworts and lichens (epihylls).

The Soils

Mangrove forests were found to occur in soils which are permanently to periodically saturated by salt or alternating saline and fresh water. The conditions are anaerobic with

A mangrove **shrub layer** which does **not** contain:

- * single stem palms with feather leaves;
- * bamboo;
- * cycads.

A mangrove **shrub layer** which does contain:

- * rare occurrence of single stem fan palms;
- * rare occurrence of palm-like shrubs;
- * occasional appearance of dicotyledonous shrubs;
- * rare occurrence of tree-ferns.

A mangrove **vine layer** which does **not** contain:

- * large thick stemmed vines;
- * large, medium and small rattans.

A mangrove **vine layer** which does contain:

- * rare occurrence of creeping vines and thin stemmed climbing vines compared to common in lowland forest.

A mangrove **herb layer** which does **not** contain:

- * hummock grasses;
- * tussock grasses;
- * sod grasses.

A mangrove **herb layer** which does contain:

- * rare occurrence of small leaved and large leaved herbs as compared with common to occasional in the lowland forest;
- * rare occurrence of ferns compared to common in the lowland forests;

- * rare occurrence of strap-leaved herbs compared to occasional in the lowland forests;
- * rare occurrence of ground lichens compared to common in the lowland forests;
- * occasional occurrence of ground mosses as compared to common in the lowland forests.

An **epiphyte layer** which is similar in structural composition to lowland forest i.e. all structural epiphytic groups are represented.

7.4 FACTORS INFLUENCING PLANT DISTRIBUTION

7.4.1 Floristics, Soils, Cyclones and Slopes

Lee (1969) reported an almost closed organic nutrient cycle on tropical rain-forests, with most of the available nutrients found in the organic-rich surface soil, with little contribution from the underlying soil horizons. He further commented that there was little evidence for a close relationship between soils and vegetation due to the high rainfall, except on the soils derived from serpentines. This is the opposite to the soil/rainforest relationships in Australia where the most diverse and luxurious rainforest vegetation is often found on the volcanics. However, Lee suggested that site factors such as altitude, slope, stability, aspect, drainage and possibly exposure to rain may influence the composition of both soils and vegetation.

Whitmore (1974) demonstrated that cyclones influence the floristic composition of the forests of Kolombangara Island (Western Solomons) and that aspect is also influential.

The tree floristic data collected by the inventory also included an assessment of cyclone damage and slope angle of the lowland forests. These were assessed by counting the number of trees on the plot greater than sixty centimetres in diameter which were uprooted or broken, probably by cyclones, with the slope angle being measured by a clinometer.

Throughout the Solomons 56% of the tree floristic plots contained at least one tree of 60 centimetres in diameter or more, which had been uprooted or broken presumably by cyclones or strong winds. Most of the plots i.e. 54% had four, or fewer, trees that were affected while only 2% had more than four.

Throughout the three floristic age/size classes, some effect was attributable to cyclones in influencing the floristic grouping and slope angle was only marginally more important.

In the greater than 60 centimetres age class only "*Palaquium* associated forest" showed a positive response to cyclones but it was also most commonly associated with level land of less than five degrees slope. "*Endospermum* associated forest" also showed a preference for sites of five degrees slope or less. Most of the other associations had a preferential occurrence on slopes of 15 to 39 degrees.

In the age/size class of trees between thirty and sixty centimetres, no positive cyclone influence could be found. However, slope angle is more important in this age class with *Eugenia buettneriana*, *Palaquium* spp/*Sterculia parkinsonii*, and *Palaquium* spp associated

forest often being found on slopes of five degrees or less. Other associations in this age class had a preferential occurrence on slopes between 15 to 39 degrees.

In the age/size class of trees between 10 and 30 centimetres, no response to cyclones or slopes was noted. All associations had a preference for slopes between 10 and 39 degrees.

7.4.2 Structure, Disturbance, Slopes, Aspect and Soils

Data on aspect, slope, soils (colour, texture, pH) and disturbance factors (plantation, landslip, old gardens, fallen trees, new gardens, cyclones, walking tracks, fire, animals, small scale logging, flooding large scale logging, and digging by animals) seedling composition, dead standing trees and the presence of logs were gathered with the structural variables.

No relationship with slope, aspect and soils were noted in the lowland forest structural cluster groups which were analysed to the seven group level.

However, a strong relationship was indicated with disturbance. Disturbance appears to be of primary importance in influencing forest structure. Of the 1,109 plots surveyed for structural features 69% were disturbed by cyclones; 57% by fallen trees (often cyclone related) 25% by animal digging, 17% by flooding, 13% by walking tracks, 9% by large scale logging, 8% by landslips, 4% old gardens, 2% by plantation, 1.5% by fire, 1% by animals, 1% new gardens, and 1% by small scale logging. Dead standing trees were discovered in 28% of the plots and logs in 74%, further indicating the importance of tree-falls which are often related to cyclones. Gaps and significantly, gap size related to disturbance, were also found to be important. Only 1.6% of the plots showed an absence of canopy gaps while 56% had a large gap size, 29% had many gaps and only 13% had small gaps. Light levels are obviously high on the canopy floor of forests with such a high disturbance making seedlings extremely abundant and vigorous with 99% of plots recording their presence.

In the four most important disturbance groups i.e. cyclone, fallen trees, digging by animals (mostly pigs) and flooding, variability occurs from island group to island group. Table Eleven shows the percentage of plots on each island group influenced by these four main variables.

TABLE ELEVEN

A COMPARISON OF THE PERCENTAGE OF PLOTS INFLUENCED
BY THE FOUR MAJOR DISTURBANCES IN EACH REGIONAL UNIT

	Percentage of plots containing variable							
	G	M	C	I	K	W	S	R*
Cyclones	65	83	67	82	60	60	85	97
Fallen trees	57	58	44	58	64	52	71	96
Cyclones + fallen trees	61	70	55	70	62	57	78	96
Animal digging	11	3	20	21	27	43	30	0
Flooding	17	14	22	16	18	15	19	5

* G - Guadalcanal Regional Unit

M - Malaita "

C - Choiseul "

I - Isabel "

K - Makira "

W - Western Province "

S - Santa Cruz "

R - Rennell "

Cyclone disturbance varied from 60% of the plots on Makira and Western Province to 85% of the plots on Santa Cruz making cyclones the predominant disturbance factor.

Data for Rennell had not been entered into the computer at the time of these analyses but a visit to the island confirmed that over 90% of the land area had been severely wind damaged by a cyclone in early 1993, leaving broken stemmed trees over all the islands. A good regenerative ability was noted from understorey trees and shrubs, pioneer trees, epicormic-like branch development in the remaining broken trees and high tree seedling vigour even though strangling *Merremia* vine development was extensive. The effect appeared severe but the ecology of the island is geared to cyclone disturbance as discussed by Wright and Schenk (1993) and regeneration will be rapid, possibly reforming a forest canopy within twenty years. This is discussed further in SOLFIP (1993). (Later, when data entry was complete, approximate percentages were obtained, as shown in Table Eleven. The inventory of the forests for Rennell took place in June and July 1993, about six months after the island was struck by Cyclone Nina.)

"Fallen tree" disturbance which is related to severe storms, cyclones and tree senescence was found to vary from 44% on Choiseul to 71% on Santa Cruz.

Digging by animals was found to be nil on Rennell and to vary from 3% on Malaita (due to the almost total extinction of wild pigs by hunting) to 43% of plots in the Western Province. Pigs prefer moist areas near streams and swamps where edible herbaceous roots are plentiful. Constant digging alters seedling and herb composition and spreads weeds.

Flooding was found to vary from 5% in Rennell and 15% in the Western Province to 22% of plots in Choiseul. Flooding would influence seedling composition and, where frequency and waterlogging are frequent, the floristics of the trees, shrubs and other life-forms would change.

8. DISCUSSION AND CONCLUSION

8.1 PLANT GEOGRAPHY AND BOTANICAL SIGNIFICANCE

Various authors, particularly Whitmore (1969 a & b) Thorne (1969) Good (1969) and Schmid (1989) have noted the so-called "paucity" of the flora of the Solomon Islands rainforests as compared those in south-east Asia. The term "paucity" is misleading and can wrongly suggest that conservation of the Solomon Islands flora is not important.

On the contrary, the flora of the Solomons is the second richest in the South Pacific, after New Caledonia, according to Schmid (1989). Solomon Islands also possesses the largest land area, highest mountain peaks and a significant variety of vegetation communities. The total number of plant species collected so far amounts to 2,783 (Henderson and Hancock, 1988) while Good (1969) suggested that the number could be half that of New Guinea, or 4,500. Since little collecting has been undertaken in the central parts of the Solomons, it is not surprising that the number collected is only 2,783.

Significantly, the flora is also semi-continental, disharmonic and relatively young. This has meant that evolution and plant migration in Solomon Islands is actively evolving, and although speciation is low, specific variation is high, due to the relative youth of these processes. This provides an opportunity to study the way forests evolve following recent migration, as well as the impact of cataclysmic disturbances such as cyclones, which are the dominant factor in the ecology of the Solomon Islands forests. Such studies are fundamentally important for forest management since an understanding of forest dynamics and ecology is necessary for sound forest management and conservation to provide a lasting timber resource and many other important forest benefits.

Another significant feature of the Solomon Islands flora is that the island group is a terminus for flora originating in Asia to the west, and from the Pacific and South America to the east. This results in a mixture of species which, although not as diverse as elsewhere, is so significantly different in composition to be of great scientific interest

A comparison, by the author, of the flora of the Solomons with that of Papua New Guinea (the major source for the Solomons flora) revealed:

a 26%, 26%, 29% reduction in *Angiosperm*, *Pteridophyte* and *Gymnosperm* families respectively; and

a 63%, 64%, 67% reduction in *Angiosperm*, *Pteridophyte* and *Gymnosperm* genera respectively from New Guinea to the Solomon Islands.

The remarkable similarity in the reduction of numbers for the families and genera across the floristic groups is also significant. One would expect that if the floral groups arrived by different dispersal methods and/or at varying times from Malesia, the composition would vary considerably between the groups. In the Solomon Islands it appears that this has not been the case: the indications are that the floral migration into the Solomons was influenced by the same environmental forces on all three groups of vascular plants.

The Solomons also possess a number of species regarded as primitive, as well as a primitive life-form group, the pachycaul treelets. Whitmore (1969a) suggests that the abundance of this particular group is due to the lack of competition from understorey trees when compared to the south-east Asian flora. In support of this, the lack of understorey trees has been shown by the inventory as only 22 species were identified as trees which never exceed 30 cm in diameter (Appendix One, Table Six).

8.2 EXISTING VEGETATION CLASSIFICATION

Classification of vegetation in the Solomon Islands has varied considerably, according to the authors. Walker (1948) Whitmore (1969a and b) Schmid (1989) and Dahl (1980) used mainly the dominant canopy trees to provide floristic groupings, while Pendleton (1949) Thorne (1969) and Henderson and Hancock (1988) attempted to use canopy floristics as well as describing understorey features. Hansell and Wall (1976) on the other hand used canopy floristics in combination with aerial photographic features such as canopy density, substrate types and slope classes, resulting in a classification which is difficult to use.

The inventory also relied on air photo interpretation to define forest types, sub-dividing six basic types (upland, hills, lowland, freshwater swamp/riverine, saline swamp and "non forest") on the basis of canopy height, density and species composition.

It is apparent that these classifications are presently inadequate for management purposes and require urgent work to update and develop them into a single classification. Analysis of the various age/size classes collected by the inventory reveals that floristics vary considerably among the age/size classes. Other understorey features should also be considered, such as the composition of the vines, epiphytes, shrubs, etc to provide a classification which reflects a holistic consideration of the Solomon Islands forest ecology.

8.3 FACTORS INFLUENCING STRUCTURE AND FLORISTICS

The climate of the Solomons provides a relatively mesic environment for the development of lowland rainforest with generally even temperatures and even rainfall. Only two areas in the island group were found to be influenced by seasonal dry weather, northern Guadalcanal/Florida and, to a lesser extent, north-western Makira. However, this results in a rainforest that varies only slightly in floristic composition from other forests in Solomon Islands, mainly in the composition of the canopy trees. Understorey structure appears to be little different from other forests, possibly because exposed ridges, particularly in karst areas which may or may not receive high rainfall, show a similar floristic composition and structure. This is due to the free drainage on these exposed karst ridges.

Geology and soils were found to have little effect on floristics and structure of the sampled forest due, presumably to the leaching effect of the high rainfall. However, there is one exception: areas with serpentine soils show this major direct edaphic factor, resulting in a forest differing in structure and floristics from the other forests. This is the only effect attributable to the geology of the Central Geological Province. Waterlogging and seasonal flooding also result in floristic changes in the canopy but structure is little influenced in these cases.

Cyclones and damage from strong winds are the major indirect factors apart from human disturbance that shape canopy floristics, and to a greater extent structure. The large gap size created by windthrows resulting from cyclones and storms, influences understorey light levels, increasing seedling numbers and changing structure (increasing the number of palms and rattans in particular). However, it can be seen in the maps of forest association that canopy floristics on each island are influenced by difficulty in tree dispersal across the sea, while structure remains little affected.

A visual analysis of the association maps shows that the floristic associations become more attenuated and disjunct in distribution towards the east. The outliers, Santa Cruz and Rennell and Bellona islands at the extreme east and south of the group have the smallest number of associations while Choiseul and Western Province in the north have the greatest number. This could indicate:

- * the migration pathway for plants in the Solomons from their major areas of Papua and New Guinea;
- * floristically richer forests in the north-west of the country than in the south-east due to the greater number of associations, this is however, contrary to the findings of the inventory where an analysis of the diversity per plot and density per plot (Appendix One, Table Five a-b) revealed no such relationship;
- * the influence of distance from the sea on canopy floristics in a still actively migrating flora;
- * a flora that is disharmonic i.e. not containing the full number of species that the forest environment could support.

Other factors which appear to be important influences on the forest structure are ephemeral flooding and digging by animals, presumably pigs. These factors are seen to influence both seedling composition and, where acute, understorey tree and shrub floristics.

The factors contributing to changes in forest structure and floristics in the lowland forests in order of scale from the most important to the least important are seen to be:

- * gardening and logging;
- * cyclones and wind damage;
- * oversea distances between islands;
- * permanent waterlogging compared to well drained ridgetops;

- * ephemeral flooding and landslips;
- * serpentine soils; and
- * other disturbance factor (animal digging, walking tracks, fire, plantations, etc).

8.4 TREE FLORISTICS - INVENTORY DATA

Comparison of the floristics list derived from the inventory data (see Appendix One, Tables Eight and Nine); with the common tree species identified by Whitmore (1966, 1969b) revealed an absence in the former of 54 species of trees exceeding a girth of two metres and six species exceeding a girth of four metres. Although some of these can be explained by changes in name, the more likely reason is misidentification in the field by the tree namers. This emphasises the point that for voucher specimens are required for accurate botanical identification.

However, it is felt that the most common species have been identified correctly and that the list can be regarded as accurate to the genus level. (Olsen and Turnbull, 1993, reported similar difficulties.)

Floristic grouping was undertaken at the eight group levels for each of the three tree age/size classes, resulting in the eight most common floristic groups. At this level the association names which result from the most common trees are considered to be accurate. These floristic groupings include the following.

Trees exceeding a diameter of sixty centimetres

1. *Pometia* associated forest
2. *Vitex/Pometia* associated forest
3. Mixed species forest containing no associated dominants
4. *Pterocarpus indicus* associated forest
5. *Dillenia salomonensis* associated forest
6. *Palaquium* spp associated forest;
7. *Endospermum* dominated forest;
8. *Camposperma brevipetiolata* associated forest.

Trees 30 to 60 centimetres in diameter

1. Mixed species forest
2. *Eugenia buettneriana* association
3. Miscellaneous species (disregarded as an association due to the fact that these are species which cannot be identified)
4. *Camposperma brevipetiolata* dominated forest
5. *Neoscortechinia forbesii* associated forest
6. *Pometia pinnata* associated forest
7. *Palaquium* spp/*Sterculia parkinsonii* associated forest
8. *Palaquium* dominated forest

Trees ten to thirty centimetres in diameter

1. *Alangium javanicum* associated forest
2. *Camposperma brevipetiolata* associated forest
3. Mixed species forest
4. *Asthronidium alatum* associated forest
5. *Semecarpus australis* associated forest
6. *Neoscortechinia forbesii* associated forest;
7. *Aglaia sapindina* associated forest;
8. *Teysmanniodendron* spp associated forest.

Comparison of these three groupings shows a difference in the importance of the particular floristic associations.

The floristic groupings for the trees exceeding 60 cm in diameter and those between 30 and 60 cm in diameter are relatively similar, but the floristic groupings below 30 cm show that understorey tree composition is distinct, possibly due to the lower light levels in that stratum. This shows that classifications based only on canopy floristics, provide a limited amount of ecological information on the Solomon Islands forests.

8.5 FOREST STRUCTURE - INVENTORY DATA

Structural features of the forest were grouped by the cluster analysis to the seven group level; however, three distinct groupings were derived from this which are due to disturbance factors.

Continuously disturbed lowland forests (e.g. constant waterlogging, fire, heavy metal concentrations, etc); or forest showing little sign of ephemeral disturbances (due to cyclones, tree-falls, flooding, temporary drainage impediment, etc). The result is the so called Clementsian climax or disclimax state.

Lowland forest where disturbances are ephemeral in nature (e.g. due to cyclones, tree-falls, flooding, temporary drainage impediment, etc) and result in the establishment of a succession (i.e. changes in structure and floristics which lead to the so called climax state).

Mangrove forest continuously affected by salinity changes, anaerobic conditions, acidic soils and water depths.

As shown in Table Ten, the forest types frequently intergrade with each other structurally, due possibly to the ubiquitous nature of disturbances and the relatively similar mesic environments provided by the Solomons climate. This intergrading is indicated by the number of the forest types in each cluster group and the very similar distribution patterns of these cluster groups as illustrated in Figure Eight (1-7). However, lowland forest (the first six cluster groups, Figure Eight (1-6) is very distinct from mangrove forest with only a minor intergrade noted for a forest which is transitional or ecotonal in nature between the two groups. The lowland rainforest was found to have six variants i.e. lowland primary rainforest, lowland primary rainforest on exposed or well drained ridges (mis-identified as montane forest by the field teams) woodland, swamp forest (and wetland) riverine forest and secondary forest. The most distinctive groupings occurred for woodlands (the first cluster) swamp forests (the first three cluster groups) riverine forest and secondary forest (clusters four, five and six). Lowland primary rainforest and lowland primary rainforest on exposed or well drained ridges, occurred in all six groups of the lowland forest clusters.

The indications here are that soil drainage and ephemeral disturbances which influence understorey light levels are the major factors resulting in structural differences and possibly to some extent, floristics. However, these are subtly masked by the mesic climate and environments.

Interestingly, aspect, soils and altitude showed no effect at low elevations. Even forests in the rainshadow area of Gaudalcanal were not sufficiently structurally distinct to be grouped separately, indicating that rainfall differences at low elevation are not critical in determining structure.

9. RECOMMENDATIONS

1. It is apparent that gap size resulting from cyclones and windthrows is the most important factor in the ecology of the Solomon Islands forests i.e. the Solomon Islands forests are maintained by "wind throw". This could be applied to forestry management since the "wind throw" effect has resulted in a predominance of gaps and a healthy seedling layer (found in nearly all the plots surveyed) due to high light levels, as well as influencing forest structure and floristics at site.

Therefore, a study of gap size, seedling dynamics and their application to forestry would certainly assist in sustainable management of the forest. Indications are that if an adequate canopy could be left, then the residual trees would not be damaged by excessive exposure and a useful new forest would soon result.

2. Further resource data is required to assess botanically significant areas.

An improved forest classification system is required which considers the understorey ecology and further botanical collections, particularly from the interior mountainous forests are also needed. The collections should aim to gather life-form groups other than trees, as the collections in the Honiara herbarium show a paucity in all groups except trees. The flora specimens at the herbarium should also be updated to reflect name changes and the true number of endemic species should be assessed. This would have to be done by overseas botanists who could effectively train the staff presently working in the herbarium.

A simple key to the over 1,500 trees and shrubs using non-flowering characteristics and line drawings would also be useful for foresters, ecologists and students etc of the Solomon Island flora.

3. A system of forest reserve should be implemented which is similar to the Wildlife Management Areas established in Papua New Guinea. These are areas of land reserved at the request of the landowners for the conservation and controlled utilisation of their wildlife and habitat. The area can cover land owned by one man, a clan, a village, or a census division or local council area. This reserve system should be actively encouraged by the Ministry of Natural Resources and a register of reserves established. To date the Ministry's efforts have been to assess and conserve animal populations, but it must be remembered that the key to conserving fauna is to conserve the habitats upon which they depend.

4. It is obvious that if improved forest management is required, then personnel are needed who are adequately trained in both management and ecology. It is recommended that a number of people in Forestry, and the Environment and Conservation Divisions be trained in ecology, botany and zoology.

5. Because treatment (logging) of forests must work with natural disturbances (wind throws) rather than ignoring them, training of forest industry managers and operators in the least

damaging methods of forest harvesting is urgently required. The Timber Control Unit of the Forestry Division could play a fundamental role in facilitating this training.

6. In order to facilitate the forest research identified during the course of this study, a priority list compiled by the Forestry Division and the Environment and Conservation Division, is recommended. Implementation of the work could be encouraged through invited research by Universities and other research bodies who would carry out research at no cost to Solomon Islands Government, through studies. This research would be monitored closely by the Ministry of Natural Resources.

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SOLOMON ISLANDS NATIONAL FOREST RESOURCES INVENTORY:
ECOLOGICAL RECORD SHEET: SPECIAL PLOTS

Recorder: Party: GRID REF:

DATE TIME FOREST TYPE SUB REG REG UNIT TRANSECT PLOT WEATHER
D R S C W

LOCALITY: Nearest village:

Environment type: Lowland Primary Forest. Montaine Primary Forest.
Secondary Forest. Scrub. Dwarf Scrub. Cloud Forest. Swamp Forest.
Wetland. Estuary. Riverine Forest. Rock. Woodland. Strand.
Grassland. Mangrove.

LAND SYSTEM

20 m CIRCULAR PLOT: SLOPE (degrees) ASPECT HEIGHT m

Distance to nearest water: m RIVER STREAM SWAMP LAKE

TREES - > 2.5m high

Tall palms single stem feather leaves C O R N
fan leaves C O R N
many stems feather leaves C O R N
fan leaves C O R N
Strangler C O R N Banyan C O R N Cycad C O R N
Tree fern C O R N Palm like tree C O R N Bamboo C O R N
Conifer C O R N Ordinary tree C O R N
Casuarina C O R N
Mangrove stilt roots C O R N Trees <30cm diameter C O R N
knee roots C O R N >30cm diameter C O R N
peg roots C O R N

HERBS - on ground

Small leaved herbs C O R N large leaved herbs C O R N

Grass hummock grass C O R N sedge C O R N
tussock grass C O R N rush C O R N
sod grass C O R N fern C O R N

Strap leaved herb C O R N Lichen C O R N

Mosses and liverworts on ground C O R N

GROUND LAYER

Tree seedlings yes no herbs absent continuous in clumps Surface water yes no
Deep water yes no
Leaf litter spread absent continuous in patches Leaf litter depth absent shallow deep
large absent Film Roll No. []
Rocks with plants Dead logs yes no Photo No. []
without plants

SOIL - 20cm below surface

Colour: Texture: PH:
black yellow sandy []
brown grey loam
orange white clay
red peat

EPIPHYTES - on trees

TRUNK / CROWN EPIPHYTES LEAF EPIPHYTES
Orchids C O R N Lichens and C O R N
Ant plants C O R N Liverworts
Lichens C O R N
Epiphytic ferns C O R N
Climbing Epiphytes C O R N
Mosses/liverworts C O R N

NOTES
Items of interest close to plot:
e.g. waterfall
cliff
cave
tambu site
waterhole
old village site
war relic

SHRUBS - < 2.5m high

Small palms single stem feather leaves C O R N
fan leaves C O R N
many stems feather leaves C O R N
fan leaves C O R N
Palm like shrubs C O R N Bamboo C O R N
Cycads C O R N Ordinary shrubs C O R N
Tree ferns C O R N

VINES

Large thick stemmed vines not going into crown C O R N
going into crown C O R N
Creeping vine C O R N Thin Stemmed Climber C O R N
Scrambler C O R N Rattan large C O R N
medium C O R N
small C O R N

CANOPY FEATURES:

canopy none (lvs touching)
gaps few small (25%) Top canopy ht high
few large medium
many (> 75%) low
Tree one only
layers 2 or 3 distinct Dead standing trees C O R N
many layers

stem sizes diameters equal Film Roll No. []
trees diameters unequal Photo No. []

Disturbance:

no disturbance yes no plantation yes no
landslip yes no old gardens yes
scattered fallen trees yes no new gardens yes
cyclone damage yes no walking tracks yes no
fire yes no animals grazing yes no
small scale logging yes no flooding yes
large scale logging yes no digging by animals yes

BUTTRESSES:

Stilt C O R N Plank C O R N Flying C O R N
Straight C O R N Club C O R N Spreading surface C O R N

Fig. 1. Data proforma sheet used by the field teams
for recording the structure & environment features.

APPENDIX ONE

APPENDIX ONE

LIST OF TABLES

- TWO: LIST OF FOREST TYPES IN THE SOLOMON ISLANDS AS DESCRIBED BY HANSELL AND WALL (1976)
- THREE: THE COMMON TREES OF THE SOLOMON ISLANDS ACCORDING TO WHITMORE (1966)
- FOUR: SOLOMON ISLANDS TREE SPECIES IDENTIFIED BY THE INVENTORY
- FIVE (a) NUMBER OF PLOTS, DISTINCT SPECIES IDENTIFIED AND TOTAL NUMBER OF RECORDS FOR EACH PROVINCE WITH ADDITIONAL CALCULATIONS ON THE AVERAGE TREE DIVERSITY AND DENSITY PER PLOT
- FIVE (b) AS FOR TABLE FIVE (a) BUT ADJUSTED FOR THE VARIABILITY IN TREE SIZE DATA COLLECTED ON GUADALCANAL, MALAITA AND RENNELL
- SIX: CANOPY/UNDERSTOREY RELATIONSHIPS OF TREES IDENTIFIED BY THE INVENTORY
- SEVEN: BIOGEOGRAPHIC DISTRIBUTION AND ABUNDANCE BY PROVINCE
- EIGHT: SOLOMON ISLANDS TREE SPECIES OVER 2 METRES IN DIAMETER
- NINE: SOLOMON ISLANDS TREE SPECIES OVER 4 METRES IN DIAMETER

TABLE TWO

LIST OF FOREST TYPES IN THE SOLOMON ISLANDS
AS DESCRIBED BY HANSELL AND WALL (1976)

A. LOWLAND RAINFOREST COMMUNITY, which contains two altitudinal variants and 24 types, namely:

1. FORESTS ON LEVEL LAND (2,528 sq km) which occurs on level land or on slopes of less than 5 degrees, such as alluvial valleys and plains and includes nine sub-types:

(i) Small crowned forest with Casuarina (6 sq km) occurring on ultrabasic rocks on Santa Isabel and San Gorge with C. papuana, but also along large braided rivers on Guadalcanal with C. eusetifolia;

(ii) Disturbed forest (921 sq km) caused by cyclones and human disturbance and often associated with old settlements;

(iii) Forest with emergents over coral terraces (400 sq km) occurring in the centre of Rennell Island;

(iv) Small-crowned forest on coral terraces (143 sq km) occurring on low offshore coral islands such as Dai and Santa Ana, some garden regrowth areas of central Rennell, or may partly include beach forest with a high number of Pandans;

(v) Camnosperma-dominated forest (53 sq km) dominated by Camnosperma brevipetiolatum which may grade into Camnosperma swamp forest but is differentiated from it by possessing greater than a 75% canopy of Camnospermum;

(vi) Medium-height, closed-canopy forest (297 sq km) identified by medium to large crowned trees which form a closed, irregular canopy of coarse uneven texture. Taller trees may occur as emergents along river vallies;

(vii) Medium-height, closed canopy forest over coral platforms, (583 sq km) identified by medium to large trees which form a closed, irregular canopy of uneven texture and occuring on coral terraces;

(viii) Tall, undisturbed, closed-canopy forest, (119 sq km) identified as a tall forest formed by large crowned trees mainly confined to river valleys and may contain trees associated with poorly drained conditions, especially Terminalia brassii;

(ix) Forest over ultramafic lowlands, (6 sq km) located on San Jorge Island, Choiseul and Guadalcanal and possessing a canopy composed of a mixture of Casuarina papuana and many medium and large crowned trees giving an open appearance to the canopy;

2. HILL FORESTS which occur on slopes greater than 5 degrees and are not influenced by flooding or waterlogging. They are characterised by a more open canopy and at higher altitudes there is an absence of large-crowned emergents and reduction in crown size. They include fifteen sub-types:

(i) Casuarina forest over ultramafic hills, (31 sq km) and occurs only on the ultrabasics of Santa Isabel and Choiseul with a closed canopy of Casuarina papuana;

(ii) Hill forest with a broken canopy (3,127 sq km) which occurs commonly throughout the hillforests as a result of recent disturbance such as cyclones or human activity. It is characterised by many small crowned secondary trees which may be of medium height to tall with some emergents;

(iii) Logged Kauri forest occurring exclusively on Vanikoro Island and Tevai Island in the lowlands;

(iv) Broken canopy forest with large emergents (68 sq km) which is characterised by widespread damage to the canopy and its replacement by low regrowth, and usually occurs as a narrow belt along ridgelines. This type is common on Santa Isabel;

(v) Hill forest dominated by Campnosperma (544 sq km) with a closed canopy. It occurs on Choiseul, New Georgia and Santa Isabel and may grade into a forest where, although Campnosperma is common, it is no longer dominant;

(vi) Fine-crowned forest on unstable slopes (851 sq km) occurring on steep unstable slopes of the higher mountains on Guadalcanal, Malaita, New Georgia and Santa Isabel. It is composed of small crowned trees which form a sparse canopy but in the valleys are found medium-crowned trees with a denser canopy;

(vii) Medium crowned, closed-canopy hill forest (14,166 sq km) is the most common forest type and is dominant on all main island groups. The trees are of medium height, and tall emergents may occur along valley bottoms and ridge crests. The canopy is closed and may contain Campnosperma;

(viii) Broken canopy forest on limestone plateaux (157 sq km) occurring on high limestone ridges on Malaita, Ranonga and Rendova. They are characterised by a small crowned dense forest with a pronounced thinning of the

canopy due to a high number of tree-ferns. It is a result of extensive clearing for subsistence agriculture;

(ix) Small-crowned forest over limestone ridges (388 sq km) characterised by a small crowned dense forest with closed canopy developed on narrow limestone ridges and on the steep outer margins of uplifted coral terraces. In the valleys the crown size increases and may rarely occur with emergents;

(x) Tall, large crowned forest on hills, (54 sq km) possessing a closed canopy with emergent crowns;

(xi) Closed canopy forest over ultramafic hills, (527 sq km) possessing a canopy dominated by Casuarina papuana but with medium crowned trees;

(xii) Closed canopy forest over ripple mark ridges (112 sq km) possessing an even canopy of small-crownwd trees, mainly Casuarina papuana, with occasional taller, larger-crowned trees in valleys but occurring on ripple-marked small ridges;

(xiii) Low, fine-crowned trees on upland ridges (522 sq km) characterised by trees which are mainly low to medium in height with a closed dense canopy. Downslope may also occur with trees which are low to medium in height. This forest occurs on all the major islands and may be a mossy aspect variant of the lowland rainforest;

(xiv) Fine-textured forest with emergents (4 sq km) characterised by a closed canopy and occasional medium to large crowned emergents of Agathis macrophylla. The type is confined solely to Vanikoro island;

(xv) Low, stunted high-altitude forest (77 km) characterised by low, mostly stunted trees with small tree crowns.

3. FRESHWATER SWAMP FORESTS containing 8 types:

(i) Casuarina swamp forest (16 sq km) characterised by a canopy dominated by Casuarina papuana and which is of medium-height to tall forest. The type is confined to swamps adjacent to ultramafic areas on San Jorge and Santa Isabel;

(ii) Swamp grasslands (47 sq km) which include several herbaceous communities with a ground cover containing scattered small trees and a herbaceous layer of grasses, sedges or reeds. These include small areas dominated by Phragmites and occur on most islands except on Vanikoro where they are replaced by a distinctive sedge vegetation;

(iii) Herbaceous swamp (4 sq km) generally found as a floating mat over deep water which may grade in Sago

swamp. The type is of limited occurrence and was identified on lakes in Makira, San Jorge and Lauvi Lagoon on the weather coast of Guadalcanal;

(iv) Camnosperma swamp forest (51 sq km) characterised by large crowned stands of Camnosperma brevipetiolata which may form widespread almost pure stands on Santa Isabel and in the New Georgia group;

(v) Mixed species forest (631 sq km) is the most widespread swamp forest found on all islands. It is characterised by having a broken canopy containing irregular sized crowns with the gaps filled with smaller regrowth trees. The composition varies from location to location and a range of tree species is present;

(vi) Pandan swamp (83 sq km) characterised by stands of Pandanus spp which forms a low and sparse canopy containing very small crowned trees. A herbaceous groundcover is also present where the canopy has a broken appearance;

(vii) Sago swamp (19 sq km) where sago is dominant;

(viii) Terminalia swamp forest (288 sq km) containing gregarious stands of Terminalia brassii with a closed and even canopy;

4. SALINE SWAMP FOREST (642 sq km) is recognized as occurring in a low topographic position near the coast and possessing a dense canopy and it contains two types:

(i) Low mangrove forest (80 sq km) which is low and sometimes stunted. It occurs along the seaward margins of coastal swamps or locally in backswamp areas;

ii) Tall mangrove forest (562 sq km) which is tall to medium in height and of mixed species composition. It occurs inland from the low mangrove forest. It is found in extensive areas in Mara Masike passage on Malaita, and on Santa Isabel and New Georgia;

5. DEGRADED FOREST AREAS (313 sq km) with tree canopy which is largely destroyed or completely absent. It includes the grasslands, fern heaths and woodlands which are fire maintained. The types identified include:

(i) Logged out forest (52 sq km) characterised by isolated trees with shattered crowns surrounded by low regrowth and bare earth all of which may become covered by creeper tangles;

(ii) Broken forest with few large trees (58 sq km) is thought to be a result of cyclone damage and is characterised by very few large trees standing as

isolated remnants with a low, irregular growth of secondary species, bamboo and creepers;

(iii) Fern dominated areas (34 sq km) is recognised by an absence of forest canopy except for some isolated pandans and small trees;

(iv) Low grasslands on ridges (83 sq km) characterised by being less than 1 m in height and is dominated by Themeda australis. It is associated with ridges and hills and may also contain scattered small crowned trees and low bushes. Small erosion hollows and slump scars which may coalesce to form large erosion gullies may also be a feature;

(v) Medium-height grasslands of alluvial plains (55 sq km) characterised by being greater than 1 m in height and dominated by Themeda australis. It is confined to northern Guadalcanal;

(vi) Open tree savanna (16 sq km) characterised by a large number of fire-resistant trees and shrubs within the grassland and is particularly noticeable on the Florida Islands;

(vii) Low woody regrowth (15 sq km) or low open woodland is characterised by trees which form a low and uneven canopy which is broken in many places. It is regarded as a later stage in the colonisation of the grasslands by forest and is confined to small hills on northern Guadalcanal, New Georgia and Makira;

6. NON-FORESTED AREAS included areas where the vegetation has been removed by human activity or by natural occurrences and as such are dominated by pioneer or regrowth species. The types identified were 'abandoned military installations' (11 sq km) 'braided river courses' (8 sq km) 'agricultural areas' (2,229 sq km) 'unvegetated landslips' (13 sq km) 'low colonising shrubs on landslips and along water courses' (200 sq km) and 'towns, villages and airstrips' (41 sq km).

TABLE THREE

THE COMMON TREES OF THE SOLOMON ISLANDS
ACCORDING TO WHITMORE (1966)*

Agathis macrophylla
Aglaia ridleyi (mis-identified as *Amoora* sp, BSIP 3667)
Albizia falcata
 " *minahassae*
 " *solomonensis*
Alstonia scholaris
 " *spectabilis*
 " *vitiensis*
Archidendron oblongum
Buchanania arborescens
Burckella obovata
 " *sorei*
Camptosperma brevipetiolata
Canarium asperum
 " *indicum*
 " *harveyi*
 " *hirsutum*
 " *liguliferum*
 " *salomonense*
 " *vitiense*
Callophyllum cerasiferum
 " *inophyllum*
 " *kajewskii*
 " *paludosum*
 " *solomonense*
 " *pseudovitiense* (formerly *C. vitiense*)
 " sp, BSIP 424
Cassidispermum magahilum
Celtis kajeskii
 " *latifolia*
 " *nymanii*
 " *paniculata*
 " *philippinensis*
Chelonospermum banikiense
 " *majus*
 " *minus*
 sp, BSIP 4227 (mis-identified as
 Planchonella sp nov)
Chrysophyllum lanceolatum
Dillenia crenata
 " *ingens*
 " *salomonensis*
Dysoxylum excelsum (formerly *D. sp*, BSIP 3637)
Elaeocarpus floridanus

" polyandrus
 " salomonensis
 " sphaericus
 Endospermum medullosum
 Erythroxylum ecarinatum
 Eugenia buettneriana
 " cincta
 " effusa
 " myriadena
 " onesima
 " tierneyana
 " sp, BSIP 3943, 5871, 3984, 5543, 3748, 922, 2677
 Ganophyllum falcatum
 Garuga floribunda
 Gmelina moluccana
 Gonystylus macrophyllus
 Haplolobus canarioides. (formerly H. sp, BSIP 3561)
 " salomonensis.(formerly H. sp, BSIP 242)
 " floribundus ssp salomonensis
 (formerly H. sp, BSIP 1631)
 Inocarpus fagiferus
 Intsia bijuga
 Manilkara dissecta
 Maranthes corymbosa
 Mastixiodendron stoddardii
 Mimusops elengi
 Neoscortechinia forbesii
 Parinari glaberrima
 " salomonensis
 Palaquium amboinense
 " erythrospermum
 " firmum
 " galactoxylum
 " masuui
 " morobense
 Pimeleodendron amboinicum
 Planchonella chartacea
 " firma
 " guillauminii
 " keyensis
 " linggensis
 " obovata
 " obovoidea
 " sessiliflora
 " thyrsoidea
 " torricellensis
 Pometia coriacea
 " pinnata
 " tomentosa
 Pouteria macleayana
 " solomonensis
 Prunus schlechteri
 Pterocarpus indicus
 Pullea sp, BSIP (1209, 2430)
 Schizomeria ilicina (formerly S. sp, BSIP 508)
 " serrata
 Spiraeopsis celebica
 Terminalia brassii

" calamansanai
" catappa
" copelandii
" sepicana (formerly T. aff. sepicana)
" solomonensis
Teysmannioidendron ahernianum
Trichadenia philippinensis
Tristiropsis acutangula
Vitex cofassus
Weinmannia blumei
" urdanetensis
" ysabelensis
Xanthophyllum papuanum

* (Whitmore indicated that only 60 trees in the Solomons were common. Examination of his lists and descriptions reveals 113 species, which are summarized and revised in this list.)

APPENDIX ONE

TABLE FOUR

SOLOMON ISLANDS TREE SPECIES
IDENTIFIED BY THE INVENTORY

(These are listed by the number of recorded occurrences to provide an indication of abundance)

Species	Family	Code	Count
<i>Pometia pinnata</i> Forst.f.	SAPIN	POMP	2235
<i>Camptosperma brevipetiolata</i> Volken	ANACA	CAMB	928
<i>Vitex cofassus</i> Reinw. ex Bl.	VERBE	VITC	832
<i>Dillenia salomonensis</i> (C.T.White) Hoogl.	DILLE	DILS	682
<i>Palaquium</i> sp	SAPOT	PAL	506
<i>Callophyllum kajewskii</i> A.C.Sm.	CLUSI	CALK	355
<i>Callophyllum vitiense</i> Turrill	CLUSI	CALV	270
<i>Pterocarpus indicus</i> Willd.	FABAC	PTEI	263
<i>Neoscortechinia forbesii</i> (Hook.f.) C.T.White	EUPHO	NIOF	258
<i>Eugenia buettneriana</i> Schum.	MYRTA	EUGB	254
<i>Burckella obovata</i> (Forst.) Pierre	SAPOT	BURO	229
<i>Terminalia aff. rubiginosa</i> Schum.	COMBR	TERR	229
<i>Endospermum medullosum</i> L.S.Sm.	EUPHO	ENDM	218
<i>Dillenia ingens</i> Burt	DILLE	DILI	207
<i>Canarium salomonense</i> Burt	BURSE	CANS	203
<i>Dysoxylum gaudichaudianum</i> (Juss.) Miq.	MELIA	DYSG	184
<i>Gmelina moluccana</i> (Bl.) Baker	VERBE	GMEM	174
<i>Terminalia brassii</i> Exell	COMBR	TERB	169
<i>Sterculia parkinsonii</i> Muell.	STERC	STEP	161
<i>Parinari salomonensis</i> C.T.White	CHRY	PARS	158
<i>Canarium indicum</i> L.	BURSE	CANI	150
<i>Agathis macrophylla</i> (Lindl.) Mast.	ARAUC	AGAM	146
<i>Canarium vitiense</i> A.Gray	BURSE	CANV	146
<i>Maranthes corymbosa</i> Bl.	CHRY	MARC	134
<i>Teysmanniodendron</i> sp	VERBE	TEY	129
<i>Amoora cucullata</i> Roxb.	MELIA	AMOC	124
<i>Terminalia calamansanai</i> (Bl.) Rolfe	COMBR	TERC	117
<i>Celtis latifolia</i> (Bl.) Planch.	ULMAC	CELL	114
<i>Alstonia scholaris</i> (L.) R.Br.	APOCY	ALSC	109
<i>Schizomeria brassii</i> Matf.	CUNON	SCHB	109
<i>Aglaia sapindina</i> (Muell.) Harms	MELIA	AGLS	106
<i>Alangium javanicum</i>	ALANG	ALGJ	101
<i>Neonauclea</i> sp (3888/4100/19144)	NAUCL	NEO	96
<i>Macaranga</i>	EUOPH	MAC	95
<i>Myristica kajewskii</i> A.C.Sm.	MYRIS	MYRK	91
<i>Elaeocarpus sphaericus</i> (Gaertn.) Schum.	ELAE	ELAP	90
<i>Canarium harveyi</i> Seem.	BURSE	CANH	86

<i>Celtis philippensis</i> Bl.	ULMAC	CELP	80
<i>Ficus</i> sp	MORAC	FIC	80
<i>Elaeocarpus floridanus</i> Hemsl.	ELAEO	ELAF	75
<i>Pimeleodendron amboinicum</i> Hassk.	EUPHO	PIMA	75
<i>Semacarpus australis</i>	ANARC	SEMA	75
<i>Dysoxylum excelsum</i> Bl.	MELIA	DYSE	67
<i>Eugenia</i> sp	MYRTA	EUG	67
<i>Planchonella obovoidea</i> (Burck.) Lamk.	SAPOT	PLAD	65
<i>Albizia falcataria</i> (L.) Fosb.	MIMOS	ALBF	64
<i>Astronidium alatum</i>	MELAS	ASTA	63
<i>Gomphandra montana</i>	ICACI	GOMM	61
<i>MeduSantahera papuana</i> (Becc.) Howard	ICACI	MEDP	58
<i>Aglaia lepiorrhachis</i> Harms	MELIA	AGLL	55
<i>Eugenia effusa</i> A.Gray	MYRTA	EUGE	54
<i>Ficus obliqua</i> Forst.f.	MORAC	FICO	51
<i>Parinari glaberrima</i> (Hassk.) Hassk.	CHRYC	PARG	51
<i>Trichospermum arachnoideum</i> Kost.	TILIA	TRYA	51
<i>Archidendron oblongum</i> (Hemsl.) de Wit	MIMOS	ARCO	50
<i>Diospyros salomonensis</i> (Bakh.) Kost.	EBENA	DIOS	48
<i>Aporosa papuana</i> Pax & Hoffm.	EUPHO	APOP	47
<i>Gonystylus macrophyllus</i>	GONYS	GNYM	47
<i>Xanophyllum papuanum</i>	XANTH	XAND	47
<i>Intsia bijuga</i> (Colebr.) Kuntze	CAESA	INTB	45
<i>Sterculia conwentzii</i> Schum.	STERC	STEC	44
<i>Syzygium aqueum</i> (Burm.f.) Alston	MYRTA	SYZA	41
<i>Cryptocarya medicinalis</i> C.T.White	LAURA	CRYM	38
<i>Stemonurus umbellatus</i> (Kan.) Sleum.	ICACI	STMU	38
<i>Heritiera solomonensis</i> Kost.	STERC	HESO	37
<i>Pangium edule</i> Reinw.	FLACO	PANE	36
<i>Bischofia javanica</i> Bl.	EUPHO	BISJ	35
<i>Sloanea insularis</i> A.C.Sm.	ELAEO	SLOI	34
<i>Casearia grewiaefolia</i> Vent.	FLACO	CACG	33
<i>Buchanania arborescens</i> (Bl.) Bl.	ANACA	BUCA	32
<i>Prunus schlechteri</i> (Koehne.) Kalkman	ROSAC	PRUS	31
<i>Trichospermum fauroensis</i> Kost.	TILIA	TRYF	26
<i>Euodia elleryana</i> Muell.	RUTAC	EUOE	25
<i>Ficus polyantha</i>	MORAC	FICP	25
<i>Planchonella obovata</i> (R.Br.) Pierre	SAPOT	PLAO	25
<i>Fagraea gracilipes</i> A.Gray	POTAL	FAGG	24
<i>Nauclea orientalis</i> (L.) L.	NAUCL	NAUO	24
<i>Endospermum moluccanum</i> (Teij. & Bin.) Becc.	EUPHO	ENDO	23
<i>Planchonella firma</i> (Miq.) Dub.	SAPOT	PLAF	23
<i>Alstonia spectabilis</i> R.Br.	APOCY	ALSP	22
<i>Myristica paleuensis</i> Kaneh.	MYRIS	MYRP	22
<i>Kingiodendron alternifolium</i> (Elmer) Merr. & Rolfe	CAESA	KINA	21
<i>Garcinia scaphopetala</i> Burt	CLUSI	GACS	20
<i>Crossostylis cominsii</i> Hemsl.	RHIZO	CRSC	19
<i>Dendrocnide mirabilis</i> (Rech.) Chew	URTIC	DENM	18
<i>Eugenia aqueum</i> Burm.f.	MYRTA	EUGA	18
<i>Elaeocarpus salomonensis</i> Kunth	ELAEO	ELAS	17
<i>Endiandra solomonensis</i> C.K.Allen	LAURA	ENIS	17
<i>Litsea flavinervis</i> Kost.	LAURA	LITF	17
<i>Rhus taitensis</i> Guill.	ANACA	RHUT	17
<i>Aglaia brassii</i> Merr. & Perry	MELIA	AGLB	16
<i>Brownlowia argentata</i> Kurz	TILIA	BROA	16
<i>Pongamia pinnata</i>	FABAC	PONP	16
<i>Timonius</i> sp	RUBIA	TIM	16

Cryptocarya alleniana C.T.White
 Finschia waterhousiana Burt
 Colona sp
 Harpullia arborea (Bl.) Radlk.
 Terminalia complanata Schum.
 Ziziphus angustifolius Harms
 Celtis nymanii
 Decaspermum fruticosum J.R. & G.Forst.
 Elaeocarpus polyandrus
 Dysoxylum arborescens Miq.
 Euodia bonwickii Muell.
 Ficus nodosa T. & B.
 Gmelina lepidota Scheff.
 Neonauclea aff. brassii Merr. & Perry
 Pittosporum sinuatum Bl.
 Toona sureni (Bl.) Merr.
 Tristiropsis acutangula Radlk.
 Alphonsea incana (Roxb.) T. & B. ex Kurz
 Artocarpus altilis (Park.) Fosb.
 Dolicholobium sp
 Gironniera celtidifolia
 Planchonella thyrsoidea C.T.White
 Pagiantha korana
 Artocarpus communis Forst.
 Planchonella keyensis Lamk.
 Syzygium cinctum Merr. & Perry
 Trichospermum peekelii
 Xylocarpus peekelii Diels
 Callophyllum cerasiferum Vesque.
 Myristica insularis Kaneh.
 Trichadenia philippinensis Merr.
 Fagraea racemosa Jack. ex Wall.
 Ficus glandulifera
 Inocarpus fagiferus (Park.) Fosb.
 Macaranga clavata
 Polyscias scutellaria (Burm.f.) Fosb.
 Securinega sp
 Trema orientalis (L.) Bl.
 Weinmannia blumei Planch.
 Albizia salomonensis C.T.White
 Barringtonia salomonensis
 Boerlagiodendron pachycephalum
 Commersonia bartramia (L.) Merr.
 Cryptocarya aureo-sericea Kost.
 Garuga floribunda Decne.
 Glochidion angulatum
 Goniothalamus sp
 Kleinhovia hospita L.
 Myristica globosa Warb.
 Neuburgia corynocarpa (A.Gray) Leenh.
 Polyscias neo-ebudanus (Guill.) B.C.Stone
 Serianthes ebudanus Fosb.
 Spondias dulcis Sol. ex Park.
 Timonius timon (Spreng.) Merr.
 Xanthostemon sp
 Xylocarpus papuana Diels
 Aglaia goebeliana Warb.

LAURA	CRYA	15
PROTE	FINW	15
TILIA	COL	14
SAPIN	HARA	14
COMBR	TERO	14
RHAMN	ZIZA	14
ULMAC	CELN	13
MYRTA	DECF	13
ELAEO	ELAY	13
MELIA	DYSA	12
RUTAC	EUOB	12
MORAC	FICN	12
VERBE	GMEL	12
NAUCL	NEOB	12
PITTO	PISI	12
MELIA	TOOS	12
SAPIN	TRSA	12
RHAMN	ALPI	11
MORAC	ARTA	11
RUBIA	DOL	11
ULMAC	GIRC	11
SAPOT	PLAT	11
APOCY	PAGK	11
MORAC	ARTC	10
SAPOT	PLAK	10
MYRTA	SYZC	10
TILIA	TRYP	10
ANNON	XYLE	10
CLUSI	CALC	9
MYRIS	MYRI	9
FLACO	TRIP	9
POTAL	FAGR	8
MORAC	FICG	8
FABAC	INOF	8
EUPHO	MACM	8
ARALI	POLS	8
EUPHO	SEC	8
ULMAC	TREO	8
CUNON	WEIB	8
MIMOS	ALBS	7
BARRI	BARS	7
ARALI	BOEP	7
STERC	COMB	7
LAURA	CRYO	7
BURSE	GARF	7
EUPHO	GLON	7
ANNON	GON	7
STERC	KLEH	7
MYRIS	MYRG	7
STRYC	NEUC	7
ARALI	POLN	7
MIMOS	SERE	7
ANACA	SPOD	7
RUBIA	TIMT	7
MYRTA	XTH	7
ANNON	XYLP	7
MELIA	AGLG	6

Erythroxylum ecarinatum	ERYTH	ERXE ERYE	6
Eugenia malaccensis L.	MYRTA	EUGM	6
Eugenia myriadena (Merr. & Perry) Whitmore	MYRTA	EUGY	6
Garcinia celebica L.	CLUSI	GACC	6
Linociera macrophylla	OLEAC	LINM	6
Litsea timoriana Span.	LAURA	LITT	6
Terminalia solomonensis Exell	COMBR	TERS	6
Aglaia argentea Bl.	MELIA	AGLA	5
Bridelia minutiflora Hook.f.	EUPHO	BRIM	5
Hernandia nymphaeifolia (Presl) Kub.	HERNA	HERN	5
Merrilliiodendron megacarpum (Hemsl.) Sleum.	ICACI	MERM	5
Antiaris toxicaria (Pers.) Lesch.	MORAC	ANTT	4
Ardisia brackenridgei (A.Gray) Mez.	MYRSI	ARDB	4
Barringtonia aff. edulis Seem.	BARRI	BARE	4
Cananga odorata (Lamk.) Hook.f. & Thoms.	ANNON	CAAO	4
Cerbera manghas L.	APOCY	CERM	4
Dracontomelon deo (Bl.) Merr.	ANACA	DRAD	4
Eriandra fragrans	POLYG	ERAF	4
Erythrina variegata L.	FABAC	ERIV	4
Fagraea salomonensis Gilg. & Benth.	POTAL	FAGS	4
Melochia umbellata (Houtt.) Stapf	STERC	MELU	4
Psychotria beccari	RUBIA	PSYB	4
Schefflera sp	ARALI	SCE	4
Terminalia rerei	COMBR	TERE	4
Cerbera floribunda Schum.	APOCY	CERF	3
Leea suaveolens Burt	LEEAC	LEES	3
Nauclea coadunata J.E.Sm.	NAUCL	NAUC	3
Octomeles sumatrana Miq.	TETRA	OCTS	3
Quassia indica	SIMAR	QUAI	3
Randia coffeoides Benth. & Hook.f.	RUBIA	RANC	3
Actinodaphne multiflora Benth.	LAURA	ACTM	2
Adenanthera pavonina L.	MIMOS	ADEP	2
Burckella salomonensis	SAPOT	BURS	2
Croton pusilliflorus Croizat	EUPHO	CROP	2
Cryptocarya invasorum Kost.	LAURA	CRYI	2
Excoecaria agallocha L.	EUPHO	EXCA	2
Glochidion ambigum A.Shaw	EUPHO	GLOA	2
Homalanthus papuanus Pax & Hoffm.	EUPHO	HOMP	2
Horsfieldia solomonensis A.C.Sm.	MYRIS	HOSO	2
Litsea perglabra C.K.Allen	LAURA	LITP	2
Pipturus argenteus (Forst.f.) Wedd.	URTIC	PIPA	2
Planchonella chartacea (Muell.) Lamk.	SAPOT	PLAC	2
Symplocos cochinchinensis (Lour.) S.Moore	SYMPL	SYMC	2
Ailanthus integrifolia Lamk.	SIMAR	AILI	1
Archidendron lucyi Muell.	MIMOS	ARCL	1
Archidendron solomonense Hemsl.	MIMOS	ARCS	1
Breynia racemosa Muell.Arg.	EUPHO	BRER	1
Claoxylum microcarpum	EUPHO	CLAM	1
Canarium vanikoroense Leenh.	BURSE	CANA	1
Casuarina equisetifolia J.R. & G.Forst.	CASUA	CASE	1
Cordia aspera Forst.f.	EHRET	CORA	1
Diospyros elliptica (Forst.) Green	EBENA	DIOE	1
Drypetes neglecta (Koord.) Pax & Hoffm.	EUPHO	DRYN	1
Dysoxylum pettigrewianum F.M.Bail.	MELIA	DYSP	1
Euodia solomonensis Merr. & Perry	RUTAC	EUOS	1
Garcinia platyphylla A.C.Sm.	CLUSI	GACP	1
Glochidion glabrum J.J.Sm.	EUPHO	GLOG	1
Hernandia papuana C.T.White	HERNA	HERP	1

Parartocarpus venenosa (Zoll. & Mor.) Becc.	MORAC	PAVE	1
Premna corymbosa	VERBE	PREC	1
Miscellaneous (unknown records)	MISC	243	

TABLE FIVE (a)

THE NUMBER OF SAMPLED PLOTS, DISTINCT SPECIES IDENTIFIED
AND TOTAL NUMBER OF RECORDS FOR EACH PROVINCE WITH
ADDITIONAL CALCULATIONS ON THE AVERAGE TREE
DIVERSITY AND DENSITY PER PLOT

Province	Plots	Species	Records	Div/plot	Den/plot
Choiseul	487	134	1,949	.275	3.39
Guadalcanal	600	115	1,895	.192	3.16
Malaita	354	96	1,088	.271	3.07
Isabel	425	142	1,584	.334	3.73
Makira	369	122	1,344	.331	3.26
Western P.	825	142	3,196	.172	3.87
Rennell	256	68	1,257	.266	4.91
Santa Cruz	344	105	1,352	.305	3.93

TABLE FIVE (b)

AS FOR TABLE 5(a) BUT ADJUSTED FOR THE VARIABILITY IN
TREE SIZE DATA COLLECTED ON GUADALCANAL, MALAITA AND
RENNELL. TREES ABOVE 60 CENTIMETRES IN DIAMETER HAVE
BEEN USED TO STANDARDISE THE AVERAGE DIVERSITY
AND DENSITY OF TREES PER PLOT

Province	Plots	Species	Records	Div/plot	Den/plot
Choiseul	463	92	1,286	.199	2.78
Guadalcanal	558	78	1,416	.140	2.54
Malaita	340	74	885	.218	2.60
Isabel	395	77	957	.195	2.42
Makira	342	66	834	.193	2.44
West	789	75	2,032	.095	2.58
Rennell	186	35	343	.188	1.84
Santa Cruz	326	51	798	.156	2.45

Note:

Species / plot = average diversity per plot (Div/plot)

Records / plot = average density of trees per plot (Den/plot)

TABLE SIX
CANOPY/UNDERSTOREY RELATIONSHIPS OF TREES
IDENTIFIED BY THE INVENTORY

Species	Code	(A	B	C	D	E)*
<i>Actinodaphne multiflora</i>	ACTM	0	0	1	1	1
<i>Adenanthera pavonina</i>	ADEP	1	0	0	0	0
<i>Agathis macrophylla</i>	AGAM	1	1	1	0	0
<i>Aglaia argentea</i>	AGLA	0	0	1	1	1
<i>Aglaia brassii</i>	AGLB	1	1	1	0	0
<i>Aglaia goebeliana</i>	AGLG	1	0	1	0	0
<i>Aglaia lepiorrhachis</i>	AGLL	1	1	1	0	0
<i>Aglaia sapindina</i>	AGLS	1	1	1	0	0
<i>Ailanthus integrifolia</i>	AILI	0	1	0	0	0
<i>Albizia falcataria</i>	ALBF	1	1	1	0	0
<i>Albizia salomonensis</i>	ALBS	1	1	0	0	0
<i>Algium javanicum</i>	ALGJ	1	1	1	0	0
<i>Alphitonia incana</i>	ALPI	1	1	1	0	0
<i>Alstonia scholaris</i>	ALSC	1	1	1	0	0
<i>Alstonia spectabilis</i>	ALSP	1	1	1	0	0
<i>Amoora cucullata</i>	AMOC	1	1	1	0	0
<i>Antiaris toxicaria</i>	ANTT	0	0	1	1	1
<i>Aporosa papuana</i>	APOP	0	1	1	1	0
<i>Archidendron lucyi</i>	ARCL	0	0	1	1	1
<i>Archidendron oblongum</i>	ARCO	1	1	1	0	0
<i>Archidendron solomonense</i>	ARCS	0	1	0	0	0
<i>Ardisia brackenridgei</i>	ARDB	0	1	1	1	0
<i>Artocarpus altilis</i>	ARTA	1	1	1	0	0
<i>Artocarpus communis</i>	ARTC	1	1	1	0	0
<i>Astronidium alatum</i>	ASTA	0	0	1	1	1
<i>Barringtonia aff. edulis</i>	BARE	0	1	1	1	0
<i>Barringtonia salomonensis</i>	BARS	0	1	1	1	0
<i>Bischofia javanica</i>	BISJ	1	1	1	0	0
<i>Boerlagiodendron pachycephalum</i>	BOEP	0	1	1	1	0
<i>Breynia racemosa</i>	BRER	0	0	1	1	1
<i>Bridelia minutiflora</i>	BRIM	1	1	1	0	0
<i>Brownlowia argentata</i>	BROA	1	1	1	0	0
<i>Buchanania arborescens</i>	BUCA	1	1	1	0	0
<i>Burckella obovata</i>	BURO	1	1	1	0	0
<i>Burckella salomonensis</i>	BURS	0	1	0	0	0
<i>Cananga odorata</i>	CAAO	1	1	1	0	0
<i>Casearia grewiaefolia</i>	CACG	1	1	1	0	0
<i>Callophyllum cerasiferum</i>	CALC	1	1	1	0	0
<i>Callophyllum kajewskii</i>	CALK	1	1	1	0	0
<i>Callophyllum vitiense</i>	CALV	1	1	1	0	0
<i>Camptosperma brevipetiolata</i>	CAMB	1	1	1	0	0
<i>Canarium vanikoroense</i>	CANA	1	0	0	0	0
<i>Canarium harveyi</i>	CANH	1	1	1	0	0
<i>Canarium indicum</i>	CANI	1	1	1	0	0
<i>Canarium salomonense</i>	CANS	1	1	1	0	0
<i>Canarium vitiense</i>	CANV	1	1	1	0	0

Casuarina equisetifolia	CASE	1	0	0	0	0
Celtis latifolia	CELL	1	1	1	0	0
Celtis nyanii	CELN	1	1	1	0	0
Celtis philippensis	CELP	1	1	1	0	0
Cerbera floribunda	CERF	1	0	1	0	0
Cerbera manghas	CERM	1	1	1	0	0
Claoxylon microcarpum	CLAM	0	0	1	1	1
Colona sp	COL	1	1	1	0	0
Commersonia bartramia	COMB	0	0	1	1	1
Cordia aspera	CORA	0	1	0	0	0
Croton pusilliflorus	CROP	1	0	1	0	0
Crossostylis cominsii	CRSC	0	1	1	1	0
Cryptocarya alleniana	CRYA	1	1	1	0	0
Cryptocarya invasorum	CRYI	0	0	1	1	1
Cryptocarya medicinalis	CRYM	1	1	1	0	0
Cryptocarya aureo-sericea	CRYO	1	1	1	0	0
Decaspermum fruticosum	DECF	1	1	1	0	0
Dendrocnide mirabilis	DENM	1	1	1	0	0
Dillenia ingens	DILI	1	1	1	0	0
Dillenia salomonensis	DILS	1	1	1	0	0
Diospyros elliptica	DIOE	0	0	1	1	1
Diospyros salomonensis	DIOS	1	1	1	0	0
Dolicholobium	DOL	1	1	1	0	0
Dracontomelon deo	DRAD	1	0	1	0	0
Drypetes neglecta	DRYN	0	1	1	0	0
Dysoxylum arborescens	DYSA	1	1	1	0	0
Dysoxylum excelsum	DYSE	1	1	1	0	0
Dysoxylum gaudichaudianum	DYSG	1	1	1	0	0
Dysoxylum pettigrewianum	DYSP	0	1	0	0	0
Elaeocarpus	ELA	1	0	0	0	0
Elaeocarpus floridanus	ELAF	1	1	1	0	0
Elaeocarpus sphaericus	ELAP	1	1	1	0	0
Elaeocarpus salomonensis	ELAS	1	1	1	0	0
Elaeocarpus Polyandrus	ELAY	1	1	1	0	0
Endospermum medullosum	ENDM	1	1	1	0	0
Endospermum moluccanum	ENDO	1	1	1	0	0
Endiandra solomonensis	ENIS	1	1	1	0	0
Eriandra fragrans	ERAF	0	1	1	1	0
Erythrina variegata	ERIV	1	1	1	0	0
Erythroxylum ecarinatum	ERXE	1	1	1	0	0
Eugenia sp	EUG	1	1	1	0	0
Eugenia aqueum	EUGA	1	1	1	0	0
Eugenia buettneriana	EUGB	1	1	1	0	0
Eugenia effusa	EUGE	1	1	1	0	0
Eugenia malaccensis	EUGM	1	1	1	0	0
Eugenia myriadena	EUGY	0	0	1	1	0
Euodia bonwickii	EUOB	1	1	1	0	0
Euodia elleryana	EUOE	1	1	1	0	0
Euodia solomonensis	EUOS	1	0	0	0	0
Excoecaria agallocha	EXCA	0	1	1	1	0
Fagraea gracilipes	FAGG	1	1	1	0	0
Fagraea racemosa	FAGR	0	0	1	1	1
Fagraea salomonensis	FAGS	1	0	1	0	0
Ficus sp	FIC	1	1	1	0	0
Ficus glandulifera	FICG	1	0	0	0	0
Ficus nodosa	FICN	1	1	1	0	0
Ficus obliqua	FICO	1	1	0	0	0
Ficus polyantha	FICP	1	1	0	0	0

<i>Ficus wassa</i>	FICW	0	0	1	0	0
<i>Finschia waterhousiana</i>	FINW	1	1	1	0	0
<i>Garcinia celebica</i>	GACC	1	1	1	0	0
<i>Garcinia platyphylla</i>	GACP	0	0	1	1	1
<i>Garcinia scaphopetala</i>	GACS	1	1	1	0	0
<i>Garuga floribunda</i>	GARF	1	0	0	0	0
<i>Gironniera celtidifolia</i>	GIRC	0	1	1	1	0
<i>Glochidion ambigum</i>	GLOA	0	1	0	0	0
<i>Glochidion glabrum</i>	GLOG	0	1	0	0	0
<i>Glochidion angulatum</i>	GLON	0	0	0	1	0
<i>Gmelina lepidota</i>	GMEL	1	0	0	0	0
<i>Gmelina moluccana</i>	GMEM	1	1	1	0	0
<i>Gonystylus macrophyllus</i>	GNYM	1	1	1	0	0
<i>Gomphandra montana</i>	GOMM	1	1	1	0	0
<i>Goniothalamus sp</i>	GON	0	1	1	0	0
<i>Harpullia arborea</i>	HARA	1	1	1	0	0
<i>Hernandia nymphaeifolia</i>	HERN	1	1	1	0	0
<i>Hernandia papuana</i>	HERP	1	0	0	0	0
<i>Heritiera solomonensis</i>	HESO	1	1	1	0	0
<i>Homalanthus papuanus</i>	HOMP	0	0	1	1	1
<i>Horsfieldia solomonensis</i>	HOSO	0	0	1	1	1
<i>Inocarpus fagiferus</i>	INOF	1	1	1	0	0
<i>Intsia bijuga</i>	INTB	1	1	1	0	0
<i>Kingiodendron alternifolium</i>	KINA	1	1	1	0	0
<i>Kleinhovia hospita</i>	KLEH	1	1	1	0	0
<i>Leea suaveolens</i>	LEES	0	0	1	1	1
<i>Linociera macrophylla</i>	LINM	1	1	1	0	0
<i>Litsea flavinervis</i>	LITF	1	1	1	0	0
<i>Litsea perglabra</i>	LITP	0	0	0	1	0
<i>Litsea timoriana</i>	LITT	0	1	1	1	0
<i>Macaranga sp</i>	MAC	1	1	1	0	0
<i>Macaranga clavata</i>	MACM	0	0	1	1	1
<i>Maranthes corymbosa</i>	MARC	1	1	1	0	0
<i>MedusaSantahera papuana</i>	MEDP	0	1	1	1	0
<i>Melochia umbellata</i>	MELU	0	0	1	1	1
<i>Merrilliodendron megacarpum</i>	MERM	1	1	1	0	0
<i>Myristica insularis</i>	MYRI	1	1	1	0	0
<i>Myristica kajewskii</i>	MYRK	1	1	1	0	0
<i>Myristica paleuensis</i>	MYRP	0	1	1	1	0
<i>Nauclea coadunata</i>	NAUC	1	0	0	0	0
<i>Nauclea orientalis</i>	NAUO	1	1	1	0	0
<i>Neonauclea sp</i>	NEO	1	1	1	0	0
<i>Neonauclea aff. brassii</i>	NEOB	1	1	1	0	0
<i>Neuburgia corynocarpa</i>	NEUC	1	1	1	0	0
<i>Neoscortechinia forbesii</i>	NIOF	1	1	1	0	0
<i>Octomeles sumatrana</i>	OCTS	1	1	0	0	0
<i>Pagiantha koroana</i>	PAGK	0	1	1	1	0
<i>Palaquium sp</i>	PAL	1	1	1	0	0
<i>Pangium edule</i>	PANE	1	1	1	0	0
<i>Parinari glaberrima</i>	PARG	1	1	1	0	0
<i>Parinari salomonensis</i>	PARS	1	1	1	0	0
<i>Parartocarpus venenosa</i>	PAVE	1	0	0	0	0
<i>Pimeleodendron amboinicum</i>	PIMA	1	1	1	0	0
<i>Pipturus argenteus</i>	PIPA	0	0	1	1	1
<i>Pittosporum sinuatum</i>	PISI	1	1	1	0	0
<i>Planchonella chartacea</i>	PLAC	1	0	1	0	0
<i>Planchonella firma</i>	PLAF	1	1	1	0	0
<i>Planchonella keyensis</i>	PLAK	1	1	1	0	0

Planchonella obovata	PLAO	1	1	0	0	0
Planchonella thyrsoides	PLAT	1	1	1	0	0
Polyscias neo-ebudanus	POLN	1	1	1	0	0
Polyscias scutellaria	POLS	0	1	1	1	0
Pometia pinnata	POMP	1	1	1	0	0
Pongamia pinnata	PONP	0	1	1	0	0
Premna corymbosa	PREC	0	0	1	1	1
Prunus schlechteri	PRUS	1	1	1	0	0
Psychotria beccari	PSYB	0	0	1	0	0
Pterocarpus indicus	PTEI	1	1	1	0	0
Quassia indica	QUAI	0	0	1	1	0
Randia coffeoides	RANC	0	0	1	1	0
Rhus taitensis	RHUT	1	1	1	0	0
Schefflera sp	SCE	1	1	1	0	0
Schizomeria brassii	SCHB	1	1	1	0	0
Securinega sp	SEC	1	1	1	0	0
Semacarpus australis	SEMA	1	1	1	0	0
Serianthes ebudanus	SERE	1	1	0	0	0
Sloanea insularis	SLOI	1	1	1	0	0
Spondias dulcis	SPOD	1	0	1	0	0
Sterculia conwentzii	STEC	1	1	1	0	0
Sterculia parkinsonii	STEP	1	1	1	0	0
Stemonurus umbellatus	STMU	1	1	1	0	0
Symplocos cochinchinensis	SYMC	1	0	0	0	0
Syzygium aqueum	SYZA	1	1	1	0	0
Syzygium cinctum	SYZC	1	1	1	0	0
Terminalia brassii	TERB	1	1	1	0	0
Terminalia calamansanai	TERC	1	1	1	0	0
Terminalia rerei	TERE	1	1	1	0	0
Terminalia complanata	TERO	1	1	1	0	0
Terminalia aff. rubiginosa	TERR	1	1	1	0	0
Terminalia solomonensis	TERS	1	1	0	0	0
Teysmanniodendron spp	TEY	1	1	1	0	0
Timonius sp	TIM	1	1	1	0	0
Timonius timon	TIMT	1	1	1	0	0
Toona sureni	TOOS	1	1	1	0	0
Trema orientalis	TREO	1	1	1	0	0
Trichadenia philippinensis	TRIP	1	1	1	0	0
Tristiropsis acutangula	TRSA	1	1	1	0	0
Trichospermum arachnoideum	TRYA	1	1	1	0	0
Trichospermum fauroensis	TRYF	1	1	1	0	0
Trichospermum peekelii	TRYP	0	0	1	1	1
Vitex cofassus	VITC	1	1	1	0	0
Weinmannia blumei	WEIB	1	1	1	0	0
Xanophyllum Paduanum	XAND	1	1	1	0	0
Xanthostemon sp	XTH	1	0	0	0	0
Xylopia peekelii	XYLE	0	0	1	1	1
Xylopia papuana	XYLP	0	0	1	1	1
Ziziphus angustifolius	ZIZA	1	1	1	0	0

* Note:

A = trees exceeding a diameter of 60cm.

B = trees between 30 and 60cm diameter.

C = trees between 10 and 30cm diameter.

D = trees not exceeding 60cm diameter.

E = trees found to be less than 30cm diameter excluding species which may exceed this diameter in the future i.e. they are exclusively found as mature trees less than 30cm diameter.

TABLE SEVEN
BIOGEOGRAPHIC DISTRIBUTIONS AND ABUNDANCE BY PROVINCE

Species	Provincial Counts*							
	C	G	M	I	W	K	R	S
Actinodaphne multiflora Benth.	0	0	0	0	0	0	0	2
Adenanthera pavonina L.	0	1	0	1	0	0	0	0
Agathis macrophylla (Lindl.) Mast.	0	0	0	0	0	0	0	148
Aglaia argentea Bl.	0	0	0	1	0	4	0	0
Aglaia brassii Merr. & Perry	3	2	0	1	0	3	7	0
Aglaia goebeliana Warb.	3	0	0	0	0	0	0	3
Aglaia lepiorrhachis Harms	6	10	1	10	3	5	16	2
Aglaia sapindina (Muell.) Harms	19	3	6	13	5	41	15	4
Ailanthus integrifolia Lamk.	0	0	0	1	0	0	0	0
Albizia falcataria (L.) Fosb.	6	7	9	9	12	4	0	17
Albizia salomonensis C.T.White	0	5	2	0	0	0	0	0
Algium javanicum	35	2	5	10	11	28	0	0
Alphitonia incana	1	1	1	2	2	4	0	0
Alstonia scholaris (L.) R.Br.	10	18	24	13	26	18	0	0
Alstonia spectabilis R.Br.	0	4	1	0	0	1	15	1
Amoora cucullata Roxb.	19	15	2	19	39	18	6	6
Antiaris toxicaria (Pers.) Lesch.	1	0	0	1	0	2	0	0
Aporosa papuana Pax & Hoffm.	13	0	3	5	4	17	5	0
Archidendron lucyi Muell.	0	0	0	0	0	0	1	0
Archidendron oblongum	5	13	1	1	25	5	0	0
Archidendron solomonense Hemsl.	0	0	1	0	0	0	0	0
Ardisia brackenridgei (A.Gray) Mez.	1	0	0	0	2	1	0	0
Artocarpus altilis (Park.) Fosb.	6	2	2	1	0	0	0	0
Artocarpus communis Forst.	1	1	0	0	7	1	0	0
Asthronidium alatum	0	0	0	12	21	0	0	30
Barringtonia aff. edulis Seem.	1	1	0	2	0	0	0	0
Barringtonia salomonensis	0	0	0	0	0	6	0	1
Bischofia javanica Bl.	7	1	1	2	2	11	6	5
Boerlagiodendron pachycephalum	0	0	0	0	0	3	0	4
Breynia racemosa Muell.Arg.	0	0	0	0	0	1	0	0
Bridelia minutiflora Hook.f.	1	1	1	1	0	1	0	0
Brownlowia argentata Kurz	0	0	0	3	2	0	11	0
Buchanania arborescens (Bl.) Bl.	3	4	1	5	14	3	0	2
Burckella obovata (Forst.) Pierre	50	60	12	29	10	28	24	15
Burckella salomenensis	0	0	0	0	0	0	1	1
Cananga odorata (Lamk.) Hook.f. & Thoms.	2	1	0	0	0	0	0	1
Casearia grewiaefolia Vent.	3	5	0	3	3	6	5	8
Callophyllum cerasiferum Vesque.	3	0	0	0	1	4	0	1
Callophyllum kajewskii A.C.Sm.	60	57	63	11	9	152	0	0
Callophyllum vitiense Turrill	15	68	0	2	11	123	0	52
Camposperma brevipetiolata Volkens	124	1	1	63	0	401	0	341
Canarium vanikoroense Leenh.	0	0	1	0	0	0	0	0

Canarium harveyi Seem.	4	29	0	11	1	7	25	9
Canarium indicum L.	11	26	32	8	64	8	0	1
Canarium salomonense Burt	24	56	9	27	61	20	0	6
Canarium vitiense A.Gray	17	29	13	9	13	29	8	27
Casuarina equisetifolia J.R. & G.Forst.	0	0	1	0	0	0	0	0
Celtis latifolia (Bl.) Planch.	29	18	18	7	9	16	15	2
Celtis Nymanii	2	0	2	1	1	3	1	3
Celtis philippensis Bl.	25	30	4	8	7	4	0	2
Cerbera floribunda Schum.	0	0	0	1	0	2	0	0
Claoxylon microcarpum	0	0	0	1	0	0	0	0
Cerbera manghas L.	0	0	0	1	0	1	0	2
Colona sp	5	0	0	8	0	0	0	1
Commersonia bartramia (L.) Merr.	0	0	0	5	0	2	0	0
Cordia aspera Forst.f.	0	1	0	0	0	0	0	0
Croton pusilliflorus Croizat	1	0	0	0	0	1	0	0
Crossostylis cominsii Hemsl.	0	0	0	2	3	10	1	3
Cryptocarya alleniana C.T.White	1	0	2	3	1	6	0	2
Cryptocarya invasorum Kost.	0	0	0	0	2	0	0	0
Cryptocarya medicinalis C.T.White	13	5	5	6	4	3	0	2
Cryptocarya aureo-sericea Kost.	0	0	0	4	0	3	0	0
Decaspermum fruticosum J.R. & G.Forst.	0	1	0	0	0	4	1	7
Dendrocnide mirabilis (Rech.) Chew	6	0	0	3	1	1	5	2
Dillenia ingens Burt	68	34	0	74	1	30	0	0
Dillenia salomonensis (C.T.White) Hoogl.	76	21	34	99	4	450	0	0
Diospyros elliptica (Forst.) Green	0	0	0	0	0	1	0	0
Diospyros salomonensis (Bakh.) Kost.	4	0	1	2	14	10	17	0
Dolicholobium sp	1	0	1	7	1	1	0	0
Dracontomelon deo (Bl.) Merr.	0	0	0	0	1	0	0	3
Drypetes neglecta (Koord.) Pax & Hoffm.	0	0	0	0	0	0	1	0
Dysoxylum arborescens Miq.	2	3	0	3	1	2	1	0
Dysoxylum excelsum Bl.	5	2	3	1	14	18	5	19
Dysoxylum gaudichaudianum (Juss.) Miq.	16	5	2	20	12	21	47	63
Dysoxylum peltigrewianum F.M.Bail.	1	0	0	0	0	0	0	0
Elaeocarpus sp	0	0	0	0	0	0	0	1
Elaeocarpus floridanus Hemsl.	16	12	1	2	2	7	30	4
Elaeocarpus sphaericus (Gaertn.) Schum.	14	14	12	8	3	10	8	21
Elaeocarpus salomonensis Kunth	5	3	3	1	0	5	0	0
Elaeocarpus Polyandrus	2	0	5	3	1	2	0	0
Endospermum medullosum L.S.Sm.	8	21	9	39	10	22	84	25
Endospermum moluccanum	1	7	0	10	3	2	0	0
Endiandra solomonensis C.K.Allen	2	5	1	3	2	0	1	1
Eriandra fragrans	0	0	0	0	4	0	0	0
Erythrina variegata L.	0	2	0	2	0	0	0	0
Erythroxylum ecarinatum	0	0	0	3	1	0	0	2
Eugenia sp	11	0	1	6	15	30	0	4
Eugenia aqueum Burm.f.	0	0	0	2	4	2	8	2
Eugenia buettneriana Schum.	17	31	4	20	30	95	25	32
Eugenia effusa A.Gray	5	15	1	0	2	28	2	1
Eugenia malaccensis L.	2	0	1	3	0	0	0	0
Eugenia myriadena	1	0	0	0	1	4	0	0
Euodia bonwickii Muell.	2	1	1	4	4	0	0	0
Euodia elleryana Muell.	8	1	6	2	2	6	0	0
Euodia solomonensis Merr. & Perry	0	0	1	0	0	0	0	0
Excoecaria agallocha L.	0	0	0	1	1	0	0	0
Fagraea gracilipes A.Gray	0	5	0	4	0	4	0	11
Fagraea racemosa Jack. ex Wall.	0	0	0	5	0	2	0	1
Fagraea salomonensis Gilg. & Benth.	2	1	0	0	0	0	0	1
Ficus sp	6	1	4	5	23	10	22	7

<i>Ficus glandulifera</i>	4	0	0	0	0	2	2	0
<i>Ficus nodosa</i> T. & B.	1	2	5	0	2	2	0	0
<i>Ficus obliqua</i> Forst.f.	7	28	4	0	3	8	0	1
<i>Ficus polyantha</i>	8	0	1	7	7	1	1	0
<i>Finschia waterhousiana</i> Burt	1	1	1	6	0	2	0	4
<i>Garcinia celebica</i> L.	0	0	0	1	0	3	0	3
<i>Garcinia platyphylla</i> A.C.Sm.	0	0	0	1	0	0	0	0
<i>Garcinia scaphopetala</i> Burt	0	1	0	2	4	10	0	3
<i>Garuga floribunda</i> Decne.	1	5	0	0	0	0	0	1
<i>Girronniera celtidifolia</i>	0	0	0	0	11	0	0	0
<i>Glochidion ambigum</i> A.Shaw	0	1	0	0	0	0	1	0
<i>Glochidion angulatum</i>	0	0	3	0	0	0	2	2
<i>Glochidion glabrum</i> J.J.Sm.	0	1	0	0	0	0	0	0
<i>Gmelina lepidota</i> Scheff.	0	0	12	0	0	0	0	0
<i>Gmelina moluccana</i> (Bl.) Baker	12	63	2	11	12	74	0	0
<i>Gonystylus macrophyllus</i>	3	0	0	0	2	42	0	0
<i>Gomphandra montana</i>	0	0	0	0	40	3	3	15
<i>Goniiothalamus</i> sp	3	0	0	1	1	1	0	1
<i>Harpullia arborea</i> (Bl.) Radlk.	9	1	0	2	0	2	0	0
<i>Hernandia nymphaeifolia</i> (Presl) Kub.	3	0	0	1	0	0	0	1
<i>Hernandia papuana</i> C.T.White	1	0	0	0	0	0	0	0
<i>Heritiera solomonensis</i> Kost.	5	7	3	2	7	12	1	0
<i>Homalanthus papuanus</i> Pax & Hoffm.	0	0	0	0	2	0	1	1
<i>Horsfieldia solomonensis</i> A.C.Sm.	0	0	0	0	2	0	0	0
<i>Inocarpus fagiferus</i> (Park.) Fosb.	4	0	0	0	1	0	1	2
<i>Intsia bijuga</i> (Colebr.) Kuntze	6	16	0	0	9	0	0	14
<i>Kingiodendron alternifolium</i> (Blmer) Merr	2	3	0	8	3	0	0	5
<i>Kleinhovia hospita</i> L.	0	3	1	1	2	0	0	0
<i>Leea suaveolens</i> Burt	1	0	0	0	2	0	0	0
<i>Linociera macrophylla</i>	0	0	0	0	1	1	3	1
<i>Litsea flavinervis</i> Kost.	0	5	2	2	0	3	5	0
<i>Litsea perglabra</i> C.K.Allen	0	0	0	0	0	0	0	2
<i>Litsea timoriana</i> Span.	3	0	1	0	0	1	0	1
<i>Macaranga</i> sp	16	0	2	17	19	21	1	15
<i>Macaranga clavata</i>	0	0	0	3	0	5	0	0
<i>Maranthes corymbosa</i> Bl.	8	0	1	15	3	66	0	42
<i>MedusaSantahera papuana</i> (Becc.) Howard	4	1	1	9	3	30	0	10
<i>Melochia umbellata</i> (Houtt.) Stapf	0	0	0	0	0	0	0	4
<i>Merrilliodendron megacarpum</i>	2	0	0	1	1	1	0	0
<i>Myristica globosa</i> Warb.	0	1	0	0	0	1	5	0
<i>Myristica insularis</i> Kaneh.	0	0	0	1	1	4	0	3
<i>Myristica kajewskii</i> A.C.Sm.	8	15	3	1	20	23	2	19
<i>Myristica paleuensis</i> Kaneh.	0	3	1	0	0	9	6	3
<i>Nauclea coadunata</i> J.E.Sm.	3	0	0	0	0	0	0	0
<i>Nauclea orientalis</i> (L.) L.	2	9	0	2	3	4	2	2
<i>Neonauclea</i> sp. (3888/4100/19144)	12	19	2	12	32	12	1	6
<i>Neonauclea</i> aff. <i>brassii</i> Merr. & Perry	2	2	3	1	1	2	0	1
<i>Neuburgia corynocarpa</i> (A.Gray) Leenh.	0	1	0	1	2	3	0	0
<i>Neoscortechinia forbesii</i>	74	17	9	15	29	112	2	0
<i>Octomeles sumatrana</i> Miq.	1	1	0	1	0	0	0	0
<i>Pagiantha korana</i>	0	0	0	2	8	1	0	0
<i>Palaquium</i> sp	30	32	13	15	22	37	353	5
<i>Pangium edule</i> Reinw.	3	4	0	0	2	1	0	26
<i>Parinari glaberrima</i> (Hassk.) Hassk.	23	7	0	2	1	11	0	7
<i>Parinari salomonensis</i> C.T.White	11	11	7	13	5	106	1	4
<i>Parartocarpus venenosa</i>	0	0	0	1	0	0	0	0
<i>Pimeleodendron amboinicum</i> Hassk.	16	9	3	7	23	17	0	0
<i>Pipturus argenteus</i> (Forst.f.) Wedd.	0	0	0	0	2	0	0	0

APPENDIX ONE

TABLE FIVE (a)

THE NUMBER OF SAMPLED PLOTS, DISTINCT SPECIES IDENTIFIED
AND TOTAL NUMBER OF RECORDS FOR EACH PROVINCE WITH
ADDITIONAL CALCULATIONS ON THE AVERAGE TREE
DIVERSITY AND DENSITY PER PLOT

Province	Plots	Species	Records	Div/plot	Den/plot
Choiseul	487	134	1,949	.275	3.39
Guadalcanal	600	115	1,895	.192	3.16
Malaita	354	96	1,088	.271	3.07
Isabel	425	142	1,584	.334	3.73
Makira	369	122	1,344	.331	3.26
Western P.	825	142	3,196	.172	3.87
Rennell	256	68	1,257	.266	4.91
Santa Cruz	344	105	1,352	.305	3.93

<i>Pittosporum sinuatum</i> Bl.	0	0	0	0	1	3	0	8
<i>Planchonella chartacea</i> (Muell.) Lamk.	0	0	0	1	0	0	0	1
<i>Planchonella obovoidea</i> (Burck.) Lamk.	1	1	0	1	0	3	59	0
<i>Planchonella firma</i> (Miq.) Dub.	8	4	0	6	2	2	0	1
<i>Planchonella keyensis</i> Lamk.	4	0	3	3	0	0	0	0
<i>Planchonella obovata</i> (R.Br.) Pierre	2	1	1	1	0	0	20	0
<i>Planchonella obovata</i> (R.Br.) Pierre	2	0	0	0	0	0	0	0
<i>Planchonella thyrsoides</i> C.T.White	5	1	2	1	0	1	1	0
<i>Polyscias neo-ebudanum</i>	0	1	0	0	0	0	0	6
<i>Polyscias scutellaria</i> (Burm.f.) Fosb.	0	2	2	0	0	0	1	3
<i>Pometia pinnata</i> Forst.f.	433	585	352	290	320	210	0	34
<i>Pongamia pinnata</i>	0	0	0	0	9	0	0	0
<i>Premna corymbosa</i>	0	0	0	1	0	0	0	0
<i>Prunus schlechteri</i> (Koehne.) Kalkman	5	2	0	6	3	14	0	1
<i>Psychotria beccari</i>	0	0	0	1	1	1	0	1
<i>Pterocarpus indicus</i> Willd.	29	14	30	15	91	7	0	80
<i>Quassia indica</i>	0	0	3	0	0	0	0	0
<i>Randia coffeoides</i> Benth. & Hook.f.	2	0	0	1	0	0	0	0
<i>Rhus taitensis</i> Guill.	0	2	2	4	7	1	0	1
<i>Schefflera</i> sp	1	0	0	1	2	0	0	0
<i>Schizomeria brassii</i> Matff.	8	24	17	5	6	49	0	0
<i>Securinega</i> sp	6	0	0	0	1	0	0	1
<i>Semacarpus australis</i>	5	1	6	4	12	1	19	27
<i>Serianthes ebudanum</i> Fosb.	0	6	1	0	0	0	0	0
<i>Sloanea insularis</i> A.C.Sm.	0	0	0	0	0	0	34	0
<i>Spondias dulcis</i> Sol. ex Park.	1	4	0	0	0	2	0	0
<i>Sterculia conwentzii</i> Schum.	10	0	9	7	4	1	3	10
<i>Sterculia parkinsonii</i> Muell.	4	4	5	4	4	1	139	0
<i>Stemonurus umbellatus</i> (Kan.) Sleum.	5	2	1	3	4	20	3	0
<i>Symplocos cochinchinensis</i>	0	2	0	0	0	0	0	0
<i>Syzygium aqueum</i> (Burm.f.) Alston	15	2	1	8	5	8	2	0
<i>Syzygium cinctum</i> Merr. & Perry	3	0	1	3	1	2	0	0
<i>Terminalia brassii</i> Exell	47	6	22	23	19	52	0	0
<i>Terminalia calamansanai</i> (Bl.) Rolfe	41	4	8	20	4	36	0	4
<i>Terminalia rerei</i>	1	0	0	2	0	1	0	0
<i>Terminalia complanata</i> Schum.	1	7	4	1	0	0	1	0
<i>Terminalia aff. rubiginosa</i> Schum.	15	17	10	26	27	16	116	3
<i>Terminalia solomonensis</i> Exell	0	1	1	1	0	0	3	0
<i>Teysmannioidendron</i> sp	1	0	0	9	4	115	0	0
<i>Timonius</i> sp	4	0	0	1	2	3	0	6
<i>Timonius timon</i> (Spreng.) Merr.	1	2	2	0	0	2	0	0
<i>Toona sureni</i> (Bl.) Merr.	0	3	1	5	2	1	0	0
<i>Trema orientalis</i> (L.) Bl.	1	2	0	4	0	1	0	0
<i>Trichadenia philippinensis</i> Merr.	1	1	0	4	2	0	1	0
<i>Tristiropsis acutangula</i> Radlk.	4	1	0	1	0	0	0	3
<i>Trichospermum arachnoideum</i> Kost.	9	4	1	30	2	5	0	0
<i>Trichospermum fauroensis</i> Kost.	6	2	0	16	0	0	0	2
<i>Trichospermum peekelii</i>	0	0	0	0	7	3	0	0
<i>Vitex cofassus</i> Reinw. ex Bl.	120	186	186	211	50	80	0	2
<i>Weinmannia blumei</i> Planch.	3	4	1	0	0	0	0	0
<i>Xanophyllum papuanum</i>	9	0	2	1	2	15	14	4
<i>Xanthostemon</i> sp	0	0	0	7	0	0	0	0
<i>Xylopi peekelii</i> Diels	1	0	0	0	0	9	0	0
<i>Xylopi papuana</i> Diels	0	0	0	1	1	3	0	2
<i>Ziziphus angustifolius</i> Harms	4	3	0	1	0	1	1	4
Miscellaneous (trees not identified)	33	63	25	27	11	31	28	26

* Provincial Count: C = Choiseul
G = Guadalcanal
M = Malaita
I = Isabel
K = Makira
W = Western Solomons
R = Rennell
S = Santa Cruz

TABLE EIGHT

SOLOMON ISLANDS TREE SPECIES OVER 2 METRES IN DIAMETER
(Source: Inventory Field Data)

Note	Species	Family	Code
++	<i>Agathis macrophylla</i> (Lindl.) Mast.	ARAUC	AGAM
	<i>Aglaia brassii</i> Merr. & Perry	MELIA	AGLB
	<i>Aglaia goebeliana</i> Warb.	MELIA	AGLG
	<i>Aglaia lepiorrhachis</i> Harms	MELIA	AGLL
	<i>Aglaia sapindina</i> (Muell.) Harms	MELIA	AGLS
*	<i>Albizia falcata</i> (L.) Fosb.	MIMOS	ALBF
*	<i>Albizia salomonensis</i> C.T.White	MIMOS	ALBS
	<i>Alangium javanicum</i>	ALANG	ALGJ
*	<i>Alstonia scholaris</i> (L.) R.Br.	APOCY	ALSC
	<i>Amoora cucullata</i> Roxb.	MELIA	AMOC
*	<i>Archidendron oblongum</i> (Hemsl.) de Wit	MIMOS	ARCO
	<i>Artocarpus altilis</i> (Park.) Fosb.	MORAC	ARTA
	<i>Bischofia javanica</i> Bl.	EUPHO	BISJ
	<i>Bridelia minutiflora</i> Hook.f.	EUPHO	BRIM
*	<i>Burckella obovata</i> (Forst.) Pierre	SAPOT	BURO
	<i>Casearia grewiaefolia</i> Vent.	FLACO	CACG
++	<i>Callophyllum cerasiferum</i> Vesque.	CLUSI	CALC
++	<i>Callophyllum kajewskii</i> A.C.Sm.	CLUSI	CALK
++	<i>Callophyllum pseudovitiense</i> Turrill	CLUSI	CALV
++	<i>Camposperma brevipetiolata</i> Volken	ANACA	CAMB
*	<i>Canarium harveyi</i> Seem.	BURSE	CANH
*	<i>Canarium indicum</i> L.	BURSE	CANI
*	<i>Canarium salomonense</i> Burt	BURSE	CANS
*	<i>Canarium vitiense</i> A.Gray	BURSE	CANV
*	<i>Celtis latifolia</i> (Bl.) Planch.	ULMAC	CELL
*	<i>Celtis nymani</i>	ULMAC	CELN
*	<i>Celtis philippensis</i> Bl.	ULMAC	CELP
	<i>Croton pusilliflorus</i> Croizat	EUPHO	CROP
	<i>Cryptocarya medicinalis</i> C.T.White	LAURA	CRYM
	<i>Decaspermum fruticosum</i> J.R. & G.Forst.	MYRTA	DECF
	<i>Dendrocnide mirabilis</i> (Rech.) Chew	URTIC	DENM
*	<i>Dillenia ingens</i> Burt	DILLE	DILI
++	<i>Dillenia salomonensis</i> (C.T.White) Hoogl.	DILLE	DILS
	<i>Diospyros salomonensis</i> (Bakh.) Kost.	EBENA	DIOS
*	<i>Dysoxylum excelsum</i> Bl.	MELIA	DYSE
	<i>Dysoxylum gaudichaudianum</i> (Juss.) Miq.	MELIA	DYSG
	<i>Elaeocarpus</i> sp	ELAEO	ELA
*	<i>Elaeocarpus floridanus</i> Hemsl.	ELAEO	ELAF
*	<i>Elaeocarpus sphaericus</i> (Gaertn.) Schum.	ELAEO	ELAP
*	<i>Elaeocarpus salomonensis</i> Kunth	ELAEO	ELAS
*	<i>Elaeocarpus polyandrus</i>	ELAEO	ELAY
*	<i>Endospermum medullosum</i> L.S.Sm.	EUPHO	ENDM
*	<i>Endospermum moluccanum</i> (Teij. & Bin.) Becc.	EUPHO	ENDO

* Erythroxylum ecarinatum	ERYTH	ERXE
Eugenia sp	MYRTA	EUG
Eugenia aqueum Burm.f.	MYRTA	EUGA
* Eugenia buettneriana Schum.	MYRTA	EUGB
Eugenia effusa A.Gray	MYRTA	EUGE
Eugenia malaccensis L.	MYRTA	EUGM
Euodia bonwickii Muell.	RUTAC	EUOB
Euodia elleryana Muell.	RUTAC	EUOE
Fagraea gracilipes A.Gray	POTAL	FAGG
Ficus sp.	MORAC	FIC
Ficus glandulifera	MORAC	FICG
Ficus obliqua Forst.f.	MORAC	FICO
Ficus polyantha	MORAC	FICP
Garcinia scaphopetala Burt	CLUSI	GACS
* Garuga floribunda Decne.	BURSE	GARF
Gmelina lepidota Scheff.	VERBE	GMEL
* Gmelina moluccana (Bl.) Baker	VERBE	GMEM
* Gonystylus macrophyllus	GONYS	GNYM
Gomphandra montana	IOACI	GOMM
Hernandia nymphaeifolia (Presl) Kub.	HERNA	HERN
Hernandia papuana C.T.White	HERNA	HERP
Heritiera solomonensis Kost.	STERC	HESO
* Intsia bijuga (Colebr.) Kuntze	CAESA	INTB
Kingiodendron alternifolium (Elmer) Merr. & Rolfe	CAESA	KINA
Linociera macrophylla	OLEAC	LINM
Litsea flavinervis Kost.	LAURA	LITF
++ Maranthes corymbosa Bl.	CHRYC	MARC
Merrilliodendron megacarpum (Hemsl.) Sleum.	ICACI	MERM
Myristica kajewskii A.C.Sm.	MYRIS	MYRK
Nauclea orientalis (L.) L.	NAUCL	NAUO
Neonauclea sp. (3888/4100/19144)	NAUCL	NEO
Neonauclea aff. brassii Merr. & Perry	NAUCL	NEOB
* Neoscortechinia forbesii (Hook.f.) C.T.White	EUPHO	NIOF
Octomeles sumatrana Miq.	TETRA	OCTS
* Palaquium sp	SAPOT	PAL
Pangium edule Reinw.	FLACO	PANE
* Parinari glaberrima (Hassk.) Hassk.	CHRYC	PARG
* Parinari salomonensis C.T.White	CHRYC	PARS
* Planchonella obovoidea (Burck.) Lamk.	SAPOT	PLAD
* Planchonella firma (Miq.) Dub.	SAPOT	PLAF
* Planchonella keyensis Lamk.	SAPOT	PLAK
* Planchonella obovata (R.Br.) Pierre	SAPOT	PLAO
* Planchonella thyrsoides C.T.White	SAPOT	PLAT
++ Pometia pinnata Forst.f.	SAPIN	POMP
Prunus schlechteri (Koehne.) Kalkman	ROSAC	PRUS
Pterocarpus indicus Willd.	FABAC	PTEI
Schizomeria brassii Mattf.	CUNON	SCHB
Securinega sp	EUPHO	SEC
Serianthes eburnea Fosb.	MIMOS	SERE
Sterculia conwentzii Schum.	STERC	STEC
Sterculia parkinsonii Muell.	STERC	STEP
Stemonurus umbellatus (Kan.) Sleum.	ICACI	STMU
Syzygium aqueum (Burm.f.) Alston	MYRTA	SYZA
Syzygium cinctum Merr. & Perry	MYRTA	SYZC
++ Terminalia brassii Exell	COMBR	TERB
++ Terminalia calamansanai (Bl.) Rolfe	COMBR	TERC
+ Terminalia complanata Schum.	COMBR	TERO
+ Terminalia aff. rubiginosa Schum.	COMBR	TERR

++	<i>Terminalia solomonensis</i> Exell	COMBR	TERS
*	<i>Teysmanniendendron</i> sp	VERBE	TEY
	<i>Timonius</i> sp	RUBIA	TIM
	<i>Toona sureni</i> (Bl.) Merr.	MELIA	TOOS
	<i>Trema orientalis</i> (L.) Bl.	ULMAC	TREO
*	<i>Trichadenia philippinensis</i> Merr.	FLACO	TRIP
*	<i>Tristiopsis acutangula</i> Radlk.	SAPIN	TRSA
	<i>Trichospermum arachnoideum</i> Kost.	TILIA	TRYA
++	<i>Vitex cofassus</i> Reinw. ex Bl.	VERBE	VITC
*	<i>Weinmannia blumei</i> Planch.	CUNON	WEIB
*	<i>Xanophyllum papuanum</i>	XANTH	XAND
	<i>Xanthostemon</i> sp	MYRTA	XTH

NOTES:

- + identified by Walker (1948) as exceeding the girth of two metres.
not identified by the inventory :

Gmelina salomonensis,
Syzygium onesimum

- * identified by Whitmore (1966, 1969b) as exceeding the girth of two metres.
not identified by the inventory :

Aglaia ridleyi,
Albizia minahassae,
Alstonia spectabilis,
Alstonia vitiensis,
Buchanania arborescens,
Burckella sorei,
Canarium asperum,
Canarium hirsutum,
Canarium liguliferum,
Callophyllum inophyllum,
Callophyllum paludosum,
Callophyllum solomonense,
Callophyllum sp BSIP 424,
Cassidispermum magahilum,
Celtis kajewskii,
Celtis paniculata,
Chelonospermum banikiense,
Chelonospermum majus,
Chelonospermum minus,
Chelonospermum sp, BSIP 4227,
Chrysophyllum lanceolatum,
Dillenia crenata,
Eugenia buettneriana,
Eugenia effusa,
Eugenia myriadena,
Eugenia onesima,
Eugenia tierneyana,
Eugenia sp, BSIP 3943, 5871, 3984, 5543, 3748, 922, 2677,
Ganophyllum falcatum,
Haplolobus canarioides,
Haplolobus salomonensis,
Haplolobus floribundus ssp. *salomonensis*,

Inocarpus fagiferus,
Manilkara dissecta,
Mastixiodendron stoddardtii,
Pimeleodendron amboinicum,
Planchonella chartacea,
Planchonella guillauminii,
Planchonella lingensis,
Planchonella obovoidea,
Planchonella sessiliflora,
Planchonella torrricellensis,
Pometia coriacea,
Pometia tomentosa,
Pouteria macleayana,
Pouteria solomonsis,
Pullea sp, BSIP 1209, 2430,
Schizomeria ilicina,
Schizomeria serrata,
Spiraeopsis celebica,
Terminalia catappa,
Terminalia sepicana,
Weinmannia blumei,
Weinmannia ysabelensis.

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APPENDIX ONE

TABLE NINE

SOLOMON ISLANDS TREE SPECIES OVER 4 METRES IN DIAMETER
(Source: Inventory Field Data)

Note	Species	Family	Code
	<i>Agathis macrophylla</i> (Lindl.) Mast.	ARAUC	AGAM
	<i>Albizia falcataria</i> (L.) Fosb.	MIMOS	ALBF
	<i>Alstonia scholaris</i> (L.) R.Br.	APOCY	ALSC
	<i>Amoora cucullata</i> Roxb.	MELIA	AMOC
	<i>Archidendron oblongum</i> (Hemsl.) de Wit	MIMOS	ARCO
*	<i>Callophyllum kajewskii</i> A.C.Sm.	CLUSI	CALK
*	<i>Callophyllum vitiense</i> Turrill	CLUSI	CALV
*	<i>Camposperma brevipetiolata</i> Volken	ANACA	CAMB
	<i>Canarium indicum</i> L.	BURSE	CANI
	<i>Celtis latifolia</i> (Bl.) Planch.	ULMAC	CELL
	<i>Dillenia ingens</i> Burt	DILLE	DILI
*	<i>Dillenia salomonensis</i> (C.T.White) Hoogl.	DILLE	DILS
	<i>Dysoxylum gaudichaudianum</i> (Juss.) Miq.	MELIA	DYSG
	<i>Eugenia</i> sp	MYRTA	EUG
	<i>Fagraea gracilipes</i> A.Gray	POTAL	FAGG
	<i>Ficus glandulifera</i>	MORAC	FICG
	<i>Ficus obliqua</i> Forst.f.	MORAC	FICO
*	<i>Maranthes corymbosa</i> Bl.	CHRY	MARC
*	<i>Pometia pinnata</i> Forst.f.	SAPIN	POMP
	<i>Pterocarpus indicus</i> Willd.	FABAC	PTEI
	<i>Terminalia brassii</i> Exell	COMBR	TERB
	<i>Terminalia</i> aff. <i>rubiginosa</i> Schum.	COMBR	TERR
	<i>Vitex cofassus</i> Reinw. ex Bl.	VERBE	VITC

Notes:

- * identified by Whitmore (1966, 1969b) as common in the canopy layer.
not identified by the inventory:
 - Elaeocarpus sphaericus*,
 - Endospermum medullosum*,
 - Gmelina moluccana*,
 - Parinari salomonensis*,
 - Schizomeria serrata*,
 - Terminalia calamansanai*.



